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REVIEW

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REVIEW

A Review for Existing Complementary and Alternative Medical Therapies for Autism Spectrum Disorder

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ABSTRACT

Autism Spectrum Disorder (ASD) has always been a frustrating disability for families and no official effective medical interventions has been found to cure this disorder yet. With more attention from the general public both nationally and internationally, more and more families and therapists showed preference to implement complementary and alternative medical (CAM) therapies. This review aims to provide more information about potential CAM that has been applied and their effectiveness.

1. Introduction

Autism Spectrum Disorder (ASD) is categorized as a type of developmental disability that is caused by a range of genetic mutations. This disorder may cause significant social, communication, and behavioral challenges which also vary for each individual. ASD has a growing prevalence that according to the Centers for Disease Control and Prevention (CDC), studies in Asia, Europe, and North America have identified individuals with ASD with an average prevalence of between 1% and 2% [34]. A wide range of possible complementary and alternative medical (CAM) therapies have been developed since the last century, but their effectiveness is different for each situation and individual. Various theories may be posed for single intervention, though more research and experiments may be required to certify its feasibility. Some CAM methods are more commonly used than others and those that have been frequently mentioned in studies and reviews are facilitated communication (FC), auditory integration training (AIT), heavy-metal chelation, secretin intervention, dietary intervention, dolphin-assisted therapy, musical therapy, and equine-assisted therapy.

2. Facilitated Communication Training

Facilitated communication starts with hand-over-hand support from the communicator as children fulfil tasks like multiple choice and fill-in-the-blanks of conversational

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texts. Then the external support would fade and the tasks change from structured to unstructured conversations [5]. An increased capability of communication and social skills is expected from this process which enables autistic children to write and express themselves freely and logically. However, studies in the following years have proved that the results from the experiment in 1992 were not reproducible and controversial. According to a review by Braman and other researchers, cases in which FC is proven to be effective, the responses received from participants were merely naming responses that are frequently one word [7]. Experiments that have already been carried out usually consist of a limited number of participants, thus the results are not as convincing and further quantitative experiments may be required to certify the effectiveness of FC as an intervention. The American Speech and Hearing Association (ASHA) has also pointed out that FC is not a recommended way of as evidenced-interventions, as it fails to meet the scientific efficacy standard. Furthermore, the risk of misinterpretation is undeniable and exists even among people without communication or social disabilities, thus the benefits from FC may be overweight by its disadvantages [38].

3. Auditory Integration Training

Auditory integration training required participants listening to pieces of modified music from headphones. This method was explicitly not recommended by ASHA due to its efficacy along with FC [38]. Experiment has also proven that the "change score" detected before and after AIT was not significant. For both parent-graded Aberrant Behavior Checklist Hyperactivity and parent Nisonger Child Behavior Rating Form Hyperactivity, the control group has more reduced score than the experimental group while the behavioral observation data for ear occlusion shows that behaviors have been increased after AIT. This experiment by Mudford showed that results from previous research proving AIT is effective is not replicable [22].

4. Heavy-Metal Chelation

The toxicity of mercury has long been well known, but the relationship between Hg and ASD was also proposed. The amount of mercury in vaccines in early childhood was discovered exceeding the standard government safety guidelines. Phenomena such as symptoms shown shortly after immunization, the increasing ASD prevalence along with vaccination increase, the similar ratio in sex of individuals influenced and a high heritability rate trend long with genetic predisposition to mercury sensitivity at low doses [4]. Since mercury could be a potential cause for ASD, the commonly seen method of removing heavy-metal from the bloodstream, chelation, is proposed as a treatment for ASD. However, this way of intervention may bring potential risk to autistic patients [38] while no adequate previously peer-reviewed publications about the efficacy of chelation treatment have been published [16]. More quantitative research may be required to determine the safety and efficacy of heavy-metal chelation as an ASD CAM treatment.

5. Secretin Intervention

Researchers like Horvath claimed that according to the observations from three autistic children after secretin treatment, gastrointestinal symptoms may have some correlation with the pathogenesis of ASD and secretin, as a type of a gastrointestinal peptide hormone, may contribute to the autistic behaviors. In his experiment, scientists observed hypersecretion of pancreaticobiliary fluid as well as detected improvements in social ability, communication and language skills [13]. However, this result was overthrown by several later experiments and evaluations. A study in 2001 doubts the reproducibility of Horvath's results that 18 boys and 2 girls in the experiment showed neither significant improvement in language skills, nor in atypical behaviors and social skills [18]. Some may argue that the previous research may be limiting as it is a single-blinded, open-label pilot study, but beside the previous study, the seven randomized controlled trials by Krishnaswami do not show adequate evidence of effectiveness of secretin as a treatment for ASD [14]. Controversial results may demand further research to be carried out to testify the effectiveness for secretin interventions and it is undeniable that individual differences may influence the data.

6. Dietary Intervention

Some scientists suspect that food allergies and sensitivities are the causes for certain behavioral challenges for autistic individuals [38]. In White's review and according to other researchers, metabolites of gluten and milk may interfere with brain function that causes abnormal behaviors as casomorphins and gliadomorphins are produced and leak out influencing the central nervous system (CNS) [39]. The two substances mentioned wouldn't be hydrolyzed by proteolytic enzymes and thus stay in a relatively stable form and constantly affect the CNS [8]. Nevertheless, casomorphins can also be detected within the human cerebrospinal fluid (CSF) [26]. From Sun and Cade's experiments, one substance of this family, β-casomorphin-7, has triggered behavioral changes when

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injected into rats [35]. Another aspect of this treatment is the opioid excess theory, which explains that the behaviors found in autistic patients expresses the effect of opioids on human brain function [39]. Young animals like rats that have exposure to low doses of opiate drugs displayed some behavioral symptoms seen in autistic children, providing evidence to the above theory [27]. By implementing dietary intervention, gluten and casein containing foods are excluded and supplements such as peptidase enzymes would be induced to breakdown casomorphin and gliadorphin into smaller peptides that have no opioid activity [10]. According to White, there are Anecdotal reports and limited single blind studies report improved social, cognitive and communication skills in individuals with autism using dietary and enzyme therapy [39]. However, a double-blind randomized controlled trial that aims to testify the effect of enzyme therapy on autistic behaviors shows that there is no significant improvement observed from the participants [23]. Moreover, a review shows that in over half of the experiments between 1977 and 2010 on dietary treatment have multiple interventions practiced by participants, so it is also difficult to isolate the effect of a single intervention [44]. Thus, from all of the results above, the evidence is not enough to accurately evaluate the effectiveness of dietary intervention and more rigorously designed research is needed.

7. Dolphin-Assisted Therapy

Dolphin-assisted therapy includes both on dock and in-water sessions and interactions with dolphins would be considered rewards of operant conditioning. The program is supported by three theories: attention deficit hypothesis, operant conditioning, and interdisciplinary team model [24]. The attention deficit hypothesis suggests that individuals with mental retardation to learning are caused by a deficit of ability to capture relevant dimensions of stimuli instead of unable to process information [31] [43]. By assisting those individuals finding cues of stimuli and being exposed under that condition long enough, triggered learning behaviors may be observed [17] [21]. This theory is later extended to neurological perspectives that attention deficit may also be caused by visual spatial frequency [29] [32], frontal lobe impairment [3] [12], and neuronal size [40]. Operant research has long been discovered and applied which turned out to be relatively effective among all methods for individuals with severe disabilities [20] [11]. The interdisciplinary team model consists of areas of, but not limited to, physical therapy, occupational therapy, speech-language pathology, special education, psychology, medicine, nursing, nutrition, and social work to guarantee its safety and effectiveness [15].

Results from a dolphin-assisted therapy research shows changes in several aspects including communicative abilities, social-emotional behavior, and mother-child interaction, whereas many are short-termed and some are mild [9]. However, many researches carried out around dolphin-assisted therapy mostly focus on children with severe disabilities in general instead of specifically accentuating its effect on ASD children, thus its efficacy for autistic patients in particular may require further studies.

8. Musical Intervention Therapy (MIT)

Musical intervention therapy implements music and music activities for the foundation of therapeutic interventions [38]. This way of intervention primarily aims to initiate and sustain joint attention and among all music, improvisational music is a key element [41]. The context of the mentioned method evolves over time which makes it more flexible and individualized. Music and lyrics are composed before the session and usually presented by recording or a sung presentation [30]. Several researchers depict the process as "meet the child" in music that the participants are able to match and reflect their feelings in the played music [1] [2] [25] [41] in other words, music serves as an assisted way to help children expressing their emotions. In such a way, this way of intervention is highly child-centered in order for them to make personal connections with the music played by therapists [41]. The musical interaction mentioned above somehow also mimics a mother-infant non-verbal interaction where the reciprocity in rhythmic, melody and dynamic style is similar to the interaction between the therapist and children [33] [28] [36] [37] [41]. In general, MIT mostly provides significant improvement in reciprocal, interactive communication and play [42] [41] though there are still participants who show negative results [30], thus MIT may be considered as an effective CAM.

9. Equine-Assisted Therapy

There are various approaches under equine-assisted therapy (EAT) which includes therapeutic horseback riding and therapeutic horsemanship. EAT can provide many positive benefits in multiple perspectives including social, emotional, communicative, and physical domains. Physically, the rhythmic equine movements are beneficial for one's balance, coordination, posture, and muscle symmetry. Mentally, there is increasing evidence that suggests EAT can also improve participants' self-esteem, self-concept, and self-efficacy [19] [6]. According to the report, individuals who receive CAM interventions

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seldom publicly mention or discuss their experiences as it may suggest they suffer from some kind of disabilities. However, in the condition of therapeutic riding, individuals may be willing to share it with their friends. Moreover, some of the participants are willing to attend activities and look forward to it [19]. The changes that are mentioned above clearly indicate the social and language improvements brought by EAT, but existing researches are limited and small in scale. The physiological benefits of EAT seem widely accepted, but the pathways for improvements of participant's mental well-being remain relatively unknown. Like many other CAM interventions, individual differences should also be taken into consideration and many interference factors are not removed. Many researches implementing EAT are not specifically focused on ASD treatment, but a particular type of disability instead. Since ASD includes a wide range of disability and atypical behaviors, the information collected is not enough to fully prove and evaluate the efficacy of hippotherapy. Additionally, considering the cost for utilizing hippotherapy on a regular basis, its prevalence and benefits may be reevaluated.

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REVIEW

The Influence of Stigma on People with Mental Illness

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ABSTRACT

People with mental illness have not only struggled with the psychological and physical symptoms of the disease but also suffered from social discrimination and prejudice. [1] This article expresses the negative impact of mental illness stigma on the stigmatized group through the study of previous literature. The purpose of this article is to improve the public's stereotypes and prejudices of people with mental illness, so as to provide a basis for researchers to identify effective de-stigmatization strategies.

1. Introduction

For a long time, people with mental illness have been in a dilemma situation. On the one hand, this target population have to struggle with the psychological and physical symptoms of the disease. Mental disorders such as depression, anxiety, bipolar disorder, and schizophrenia can bring hallucinations, anxiety, mood swings and other issues to individuals [2]. On the other hand, the stigma comes from social misunderstandings and stereotypes of mental disorders has resulted in secondary trauma to patients with mental illness. This article will analyze and discuss the negative effects of stigma on people with mental illness by exploring the conceptual background and types of stigma [3]. The purpose of this article is to help the stigmatized groups and researchers to further understand the stigma of mental illness by exploring the definition of stigma and its impact on patients with mental illness, so as to provide the further foundation for de-stigmatization education and other anti-stigma measures.

2. Mental Illness Stigma Influence

Although the living environment of patients with mental illness has been improved with the popularization of education and the advancement of social patterns, the social norm they live in is still full of discrimination and misunderstanding [4]. This article will elaborate on the negative impact of stigma on patients with mental illness from the perspectives of housing, occupation, healthcare as well as self-confidence and self-esteem.

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2.1 Influence in Housing

It is proved that there is a negative correlation between socioeconomic status and mental illness. The low income and economic difficulties affected by the stigma would bring housing challenges. Due to the cross-effects caused by stigma, the housing conditions of patients with mental illness also face severe challenges. Studies have shown that most people with mental illness labels have the problems of insufficient housing and lack of safety guarantees [2]. Even if this population have an independent source of income to pay the rent, their only option is in low-income communities with lower housing standards and a higher risk of crime [2]. Although in these low-income communities, people with mental illness still do not have an advantage in housing competition compared with other potential tenants as some proportion of patients with severe mental illness lack social and coping skills, which makes it difficult to meet the demand for competitive independent housing [5]. According to Kowalchuk, more than half of people with mental illness are dissatisfied with their living conditions [9]. The continuity and security provided by a safe and stable house may bring about symptom improvement for individuals with severe mental illness and facilitate the reconstruction of interpersonal relationships.

2.2 Influence in Employment

People with mental health problems are disadvantaged in the field of employment. Baldwin and Marcus point out that people with mental illness suffer from unexplained high and significant levels of negative wage differences at work [6]. The reasons for this difference can be explained by stigma and discrimination. People with mental illness also face barriers in the job-hunting process. For example, gaps in resumes resulted from mental illness may lead to these job applicants to be eliminated in the first step [4]. Another serious challenge is that people suffering from mental illness not only experience stigma when applying for jobs but when they return to work. They may be in an unsafe situation that suffering differential treatment from colleagues including bullying, ridicule and demotion [4]. In addition, the impact of self-stigma on occupation is particularly reflected in work value and work connection. Studies have shown that the decline in self-esteem and self-efficacy resulted from self-shame can cause the "why try effect" that people with mental illness who internalize stigma believe that they are not worthy and do not have the ability to work independently [3].

2.3 Influence in the Medical System and Healthcare-seeking

Research has identified that stigma leads to various problems in healthcare, which directly or indirectly affect the access and quality of medical care for patients with mental disorders. A study on the medical and health of mental illness shows that compared with people without illness, people with mental illness are less likely to benefit from the medical system. [7]. Druss et al. conclude that people with mental illness receive significant less medical service than those without a mental illness label. Specifically, due to the lack of professionalism of some health professionals and the inherent stereotypes of mental illness, individuals with mentally ill report that it is difficult to avoid discrimination and derogation in the process of treatment in the medical system [1].

There is an incomprehensible phenomenon exists in the workplace of healthcare, which is that the healthcare field usually simplifies the mental health issues of employees and describes it as a cultural phenomenon [1]. Healthcare practitioners are not encouraged to seek help with mental health in the workplace. These unprofessional operations push the mentally ill patients out of the medical and health system, thus increasing the difficulty of treatment. In addition, self-stigma is an obstacle for people with mental illness to actively seek health treatment as stigma may be an intangible factor that undermines the participation of people with mental illness. Another challenge is that even if individuals with mental illness overcome the adverse effects of the initial labelling, the "why try effects" due to self-stigma during the treatment phase may contribute to doubts that the treatment will not bring real positive effects and thus terminate treatment [3]. Studies have shown that up to 20% of people may discontinue treatment during the treatment of mental illness [8].

2.4 Influence in Self-confidence and Self-esteem

Although not all people with mental illness have completed the process of internalizing stigma, a considerable number of patients internalize negative stereotypes that therefore affect their self-confidence and self-esteem. Explaining why the stigma of mental illness can affect self-confidence and self-esteem requires understanding the "why try effect". "Why try effect" includes three processes, which are self-discrimination, systemic mediation of self-esteem and self-efficacy, and the achievement of life goals or negative orientation causes value loss [8]. When mentally ill patients experience the process of understanding the public's stereotypes about the stigmatized group, agree with these labels and complete their own ste-

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reotypes, the "why try effect" occurs [8]. The influence of the "why try effect" on individuals suffering from mental illness is the negative and discriminatory attitudes experienced in the process of an individual's internalization. Individuals may refuse to try beneficial behaviours that are conducive to recovery with the aims of avoiding the negative impact of the public on enhanced labelling. After an individual internalizes the public's label against the stigmatized group, it will lead to lower self-confidence and self-esteem because of shame [9]. Specifically, people with mental illness experience both the "why try" effect and the dual impact of public stigma and self-stigma, leading to loss of sense of value in life, the frustration of self-esteem, and lack of confidence and continuity to take action [9]. The results of low self-esteem and low self-confidence not only affect routine rehabilitation but brings numerous negative consequences to work and life.

3. Conclusion

On the basis of previous literature research, this article focuses on the negative effects of stigma on mental patients from the aspects of accommodation, occupation, healthcare system, self-confidence and self-esteem. As stigma is a complex phenomenon, it is necessary to expand research on public stigma, self-stigma, and the impact of stigma on mentally ill patients, especially more investment in medical area since this field is closely related to rehabilitation. One limitation is that this paper only discusses part of the negative effects of stigma on mental patients, which lacks effective strategies to manage the negative consequences of stigma on mental patients. Another obstacle that needs to be improved is that the article only has a limited selection of the negative effects of stigma, ignoring the mental illness stigma influence on their families. Therefore, it is necessary to conduct further empirical research to find out the best strategy to improve the negative effects of stigma to reduce the stigmatized attitudes and behaviors of mental patients. In addition, more research needs to be invested in the content of the relationship between stigma and self-efficacy and self-esteem.

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ARTICLE

Effects of Color on the Buildup and Resolution of Proactive Interference in Working Memory

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ABSTRACT

The "color superiority effect" was confirmed by the research of color on forgetting, which showed that proactive interference (PI) has less impact on colored items than gray ones. Color could directly affect the buildup of PI, leading to reduced levels of interference, or controlled processes that resolve PI. However, the effects of red and green on memory were inconsistent. Using Recent-Probes task, the current study explored how the red and green color influenced to the buildup phase (i.e., 200ms after the onset of probe) and resolution phase (i.e. 800ms after the onset of probe) of PI. Results revealed that the reaction times of green words were significantly shorter than the red words under 200ms. There were no significant differences between the red and green words under 500ms and 800ms. It indicated that green might shortened the reaction times for the PI buildup, while red prolonged it. However, on the resolution phase of PI, green words were less effective than red words. These findings offered some new information for the underlying mechanisms that modulate the interactions between color and memory.

1. Introduction

The "color superiority effect" in memory refer to a memory effect that individuals generally recognized colored items better than black-and-white ones [1-3]. However, researchers found the various color had different influence on the individual memory. For example, "green supremacy effect" was found, in which participants showed a better memory performance for green-colored items, compared with red-colored items [4]. But the other study found that memory for red -colored items was particularly higher than green[5]. Therefore, further research about the mechanisms of red and green color on memory is needed.

Proactive Interference (PI) is the interference from prior memories, which thought to contribute to the individual forgetting and also positively associated with Working Memory (WM) capacity [6]. Researchers found that it had better performance in the presence of PI when the stimuli were given various colored compared to gray stimuli. The result confirmed "color superiority effect" based on the perspective of PI, and indicated that color

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increased the discriminability between content-context bindings in WM [7].

In recent years, researchers proposed that the PI should be composed of different stages, i.e. the buildup of PI, reflecting the early/automatic familiarity-based processes, and the resolution of PI, reflecting the later/controlled processes that access contextual information [8]. Mızrak and Öztekin [9] found that negative emotional stimuli led to a slower buildup of PI, but in the resolution of PI it was less effective than neutral stimuli. The other study showed that positive emotional stimuli might contribute to the resolution of PI [10].

The colors red and green seem also to have relevance in emotional contexts [11]. Typically, red is used as a signal for negative, especially threatening information (e.g., alarms, warning signals), whereas green signals security and safety [12].

Given the ubiquity of such color usage in everyday life, red and green might have acquired the function of implicit cues alerting the perceiver to imminent danger or potential benefits. Studies showed that red was strongly associated with dominance and arousal, but green was slightly associated with arousal. And green was slightly more pleasurable than red [13,14]. Therefore, whether red and green, which are associated with different emotions, also have different effects on the buildup and resolution of PI, which is a new perspective to explore the effect of different colors on memory.

On the basis of the investigations, the present study used 200, 500, or 800 ms as the duration of response deadline to Recent-probes task consisting of red, green and blue (as a control color) words to explore the effects of red and green on the buildup and resolution of PI. We hypothesized that red and green could impact the buildup and resolution of PI differently. Red and green would have higher accuracy and shorter reaction times than blue stimuli when PI buildup. But the resolution of PI for red stimuli was less effective than green in accuracy and reaction times.

2. Methods

2.1 Participants

32 healthy adults (16 males and 16 females) were recruited for this study and received monetary compensation. The average age was 22 years (range 20 - 26 years). All participants were right-handed and had normal or corrected-to-normal vision. Informed consent from all participants was obtained in accordance with the Ethical Committee of Capital Normal University.

2.2 Material

906 Chinese words were selected from the Modern Chinese frequency dictionary (Liu, 1990), with means of 106.99 on frequency, ranging from 5 to 2042. Before the experiment, twenty students who did not participate in the experiment were randomly invited to rate the words' valence on a scale ranging from 1 (lowest pleasure) to 9 (highest pleasure), the arousal on a scale ranging from 1 (lowest arousal) to 9 (highest arousal), the familiarity from 1 (very unfamiliar) to 9 (very familiar). Rating by college students, the 906 words were chosen with neutral valence (M = 5.08, SD = 0.43), medium arousal (M = 3.03, SD = 0.5), medium familiarity (M = 6.84, SD = 0.91).

There were no significant differences between the words used as targets and lures on frequency, t (452) = 0.02, $p > 0.05$; valence, t (452) = .97, $p > 0.05$; arousal, t (452) = 0.19, $p > .05$, and familiarity, t (452) = 0.14, $p > 0.05$. All the words used in the experiment were 14 points in bold with Microsoft black made in Photoshop. The properties of the three colors were chosen according to the RGB model (red: 255, green: 0, blue: 0; green: 255, red: 0 and blue: 0; blue: 255, green: 0, red: 0).

2.3 Design

The experiment adapted the Recent-Probes Task (RP Task), a widely used paradigm to induce PI by presenting lures from previous study list (see Figure 1). Participants are given a series of trials in which they are presented a target-set of items to commit to memory, then they are given a single probe item and must decide whether this probe matches one of the items in that trial's target-set. Some probes will match one of the target-set items, thereby eliciting a positive response while some will not match and will elicit a negative response. On some of the trials, a probe that had not been a member of the current trial's target-set was drawn from the previous trial's target-set (called "recent negative probes"). On other trials, the negative probes had not appeared recently as members of other target-sets ("non-recent negative probes"). This manipulation was also applied to positive probes to yield recent and non-recent positive probes [15].

For trials when the target-set included four items, Monsell [16] showed that recent-negative probes yielded responses that were approximately 75 ms longer and 7% less accurate than non-recent negative probes. That is, there was PI from the previous trial's target-set on the current trial's negative response. Therefore, PI was calculated as the difference between recent negative and non-recent negative trials, and non-recent trials could be used to assess participants' global Working Memory (WM)

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performance

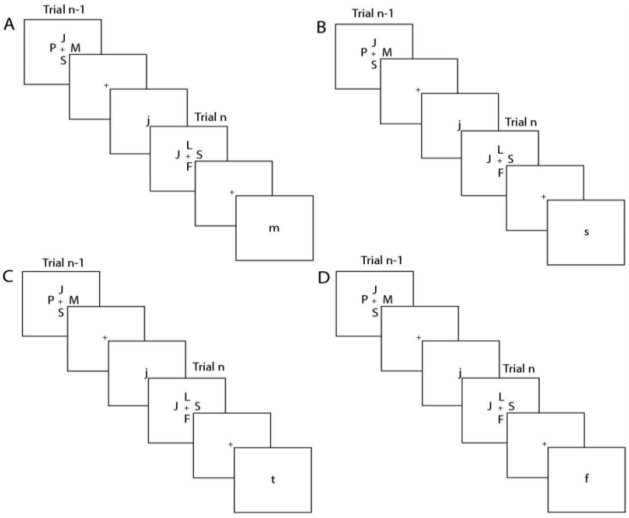

Figure 1. A schematic of the Recent-Probes Task. The four panels show the four central conditions. Panel A represents the recent-negatives (RN); Panel B represents recent-positives (RP). Panel C represents non-recent negatives (NN); and Panel D represents non-recent positives (NP)

In addition, in RP Task, the buildup and resolution of PI can be investigated by controlling of the presentation time of the recognition probe [9]. At early, middle or late period after the onset of the recognition probe, a tone sounded to cue participants to respond as soon as possible. When the probes were presented for a shorter time (200ms), subjects tended to make fast assessment based on the familiarity information, in which the buildup of PI could be observed. When the probes were presented for a longer time (800 ms), individuals had enough time to retrieve contextual information, in which the resolution of PI could be observed. When the probe was presented for a moderate time (500 ms), the familiarity-based processes was being replaced by controlled processes, in which the initial phase of PI resolution could be observed.

2.4 Procedure

Figure 2 showed below illustrated the sequence of events in a single trial. Each trial began with 500ms of fixation, followed by a target set with three words all in red, blue or green for 1,000 ms in a 2 ×1 array and retained in memory during a retention interval of 1000ms. This interval was followed by a single black word as a recognition probe. At 200 ms, 500 ms or 800 ms after the onset of the probe, a 50 ms tone sound cued participants to respond whether or not the probe was presented in the target set by pressing mouse button. Participants were indicated to provide "yes" (left mouse button) or "no" (right mouse button) as quickly as possible after the onset of the tone. After providing a response, they were given feedback on their reaction times. They were informed that responses longer than 300 ms were too slow and responses less than 100 ms were anticipations, and both should be avoided. Participants were trained to respond within 300 ms after the tone. Stimulus were presented by Eprime software.

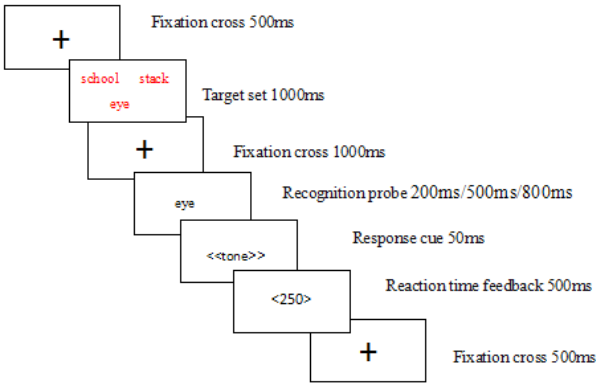

Figure 2. Example of one experimental trial

The red, blue and green conditions were tested in three different sessions. Each session consisted of 4 blocks of 48 trials, including 24 positive trials, 12 recent negative (RN) trials and 12 non-recent negative (NN) trials. Before beginning the experiment, subjects were given written and oral instructions and completed 10-min practice session under supervision by an experimenter using stimuli from different pools of words than those used during the experimental trials.

2.5 Statistical Analyses

Data collected included accuracy (ACC) and response times (RTs). RTs were calculated for correct trials only. Responses faster than100 ms, and longer than 600 ms were excluded from analyses. Repeated measures analyses of variance (ANOVAs) were performed separately on accuracy (ACC) and RT data. To explore the effect of color on PI during short-term item recognition, only the negative probes were analyzed. Secondly, the analyses of non-recent probes provided information about the impact of color on WM performance. Two parts of the analyses could not only help us to explore the effects of color on the buildup and resolution of PI, but also whether the color had the same impact on PI and WM performance.

3. Results

3.1 The Impact of Color on the Buildup and Resolution of Proactive Interference

Analyses of responses to RN and NN provided us the result of color on PI. Responses based on familiarity which

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were dominant in 200 ms, reflected the buildup of PI, and those based on recovery of contextual information that were dominant in 800 ms, reflected successful resolution of PI.

3.1.1 Accuracy

An overview on descriptive measures about accuracy (ACC) of negative probes was provided in Table 1. Using a 3 (color: red, blue, and green) × 3 (response deadline: 200 ms, 500 ms, and 800 ms) × 2 (recency: recent negatives vs. non-recent negatives) analysis of variance (ANOVA) on accuracy scores, main effects of response deadline, [$F(2, 62) = 50.45$, $p < 0.01$, $\eta^2_p = 0.619$], and recency [$F(1, 31) = 24.68$, $p < 0.01$, $\eta^2_p = 0.443$] were found, as well as significant response deadline × recency interaction [$F(2, 62) = 25.68$, $p < 0.01$, $\eta^2_p = 0.453$]. No color × response deadline [$F(4,124) = 0.573$, $p = 0.65$, $\eta^2_p = 0.018$] nor color × recency [$F(2,62) = 0.898$, $p = 0.399$, $\eta^2_p = 0.028$] interaction was found, which meant that the ACC of negative probes was comparable across the three colors.

Follow-up pairwise comparisons revealed that for all experimental conditions, ACC in the RN trials was siginificantly lower than NN trials ($p < 0.001$), and the ACC of RN probes was lowest under 200 ms (M=0.79) compared with 500ms (M=0.90) and 800ms (M=0.93) ($p < 0.001$). Cause that PI could be calculated as the difference between compared trials. The result indicated that the ACC of participants were subject to PI under all respond deadlines, but the influence of PI under 200ms was more significant than 500ms and 800ms (see Figure 3).

Table 1. Means and standard deviations (in parentheses) of accuracy of negative probes in the RP Task

Probe Condition	Red words			Blue words			Green words		
	200ms	500ms	800ms	200ms	500ms	800ms	200ms	500ms	800ms
RN	0.78 (0.16)	0.91 (0.13)	0.94 (0.1)	0.79 (0.17)	0.89 (0.16)	0.92 (0.14)	0.80 (0.16)	0.91 (0.11)	0.94 (0.09)
NN	0.93 (0.1)	0.98 (0.03)	0.98 (0.04)	0.94 (0.06)	0.98 (0.05)	0.99 (0.04)	0.93 (0.09)	0.99 (0.03)	0.98 (0.03)

Note:

RN means recent negative probes; NN means non-recent negative probes.

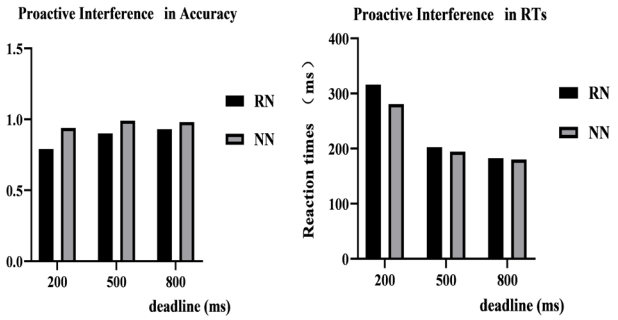

Figure 3. Proactive Interference in accuracy under response deadlines of 200ms, 500ms, and 800ms. RN means recent negative probes. NN means non-recent negative probes

3.1.2 Reaction Times

The analyses of reaction times (RTs) restricted to trials for which a correct response was provided. An overview on descriptive measures about RTs of negative probes was provided in Table 2. A repeated-measurements ANOVA with color (red, blue, and green) × response deadline (200ms, 500ms, and 800ms) × recency (recent negatives vs. non-recent negatives) resulted in a significant interaction between color and deadline, $F(4, 124) = 3.06$, $p < 0.05$, $\eta^2_p = 0.09$. Following a simple effect analysis, we detected a significant color difference when the response deadline was 200ms ($p < 0$ .05) and a marginally significant color difference under 500ms ($p = 0.08$), but we did not find a color difference under 800ms ($p = 0.94$). Under 200ms, the RTs of green words (M=291.67) were significantly shorter than red words (M=304.78). While it had not shown any significant difference across all colors under 500ms and 800ms. The result indicated that compared with red, green color might shortened the RTs during the PI buildup, while the resolution of PI for green words was less effective than red words (see Figure 4). Furthermore, the RTs under 200ms were significantly longer than 500ms and 800ms under three colors ($p < 0$ .05), which indicated that the effect of PI under 200ms is bigger than 500ms and 800ms under all three colors.

In addition, the results showed a main effect of recency, $F(1, 31) = 68.77$, $p < 0.01$, $\eta^2_p = 0.689$, a main effect of response deadline, $F(2, 62) = 290.12$, $p < 0.001$, $\eta^2_p = 0.903$ and a significant interaction between response deadline and recency, $F(2, 62) = 35.17$, $p < 0.01$, $\eta^2_p = 0.532$. Further simple analysis showed that recent probes were answered slower than non-recent probes under 200ms (NN: M=280.99, RN: M=316.13, $p < 0.001$) and 500ms (NN: M=202.60, RN: M=194.66, $p < 0.01$), but was not under 800ms ($p > 0.05$), which indicated that the RTs of

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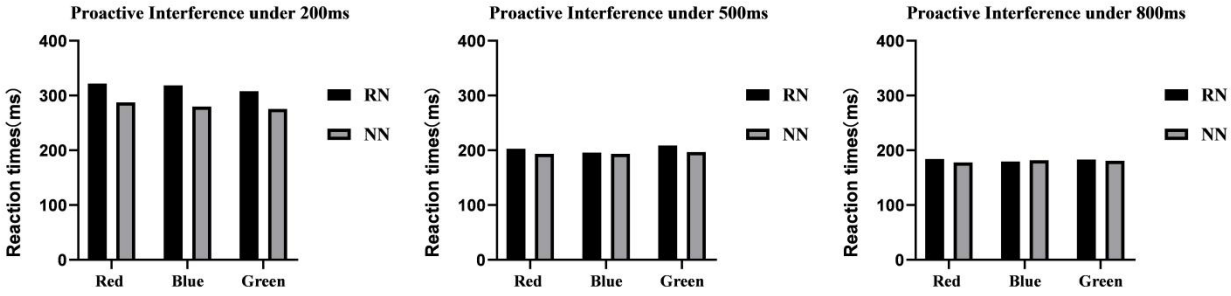

Figure 4. Reaction times in negative probes under 200ms, 500ms and 800ms. RN means recent negative probes; NN means non-recent negative probes

participants were subject to PI under 200ms and 500ms, but the influence of PI was not significant under 800ms. Besides, the RTs of RN probes under 200ms (M=316.13) were significantly longer than 500ms (M=202.60) and 800ms (M=182.39) ($p < 0.001$), which indicated that the influence of PI under 200ms is bigger than 500ms and 800ms (see Figure 5).

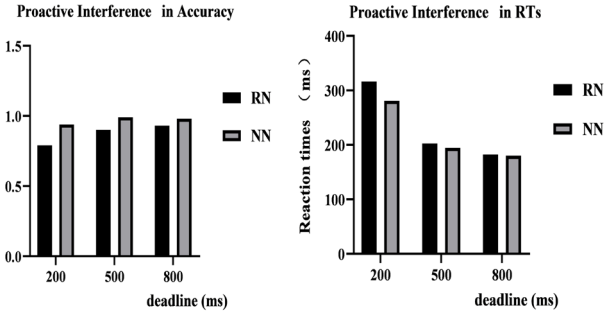

Figure 5. Proactive Interference in reaction times under response deadlines of 200ms, 500ms, and 800ms. RN means recent negative probes. NN means non-recent negative probes

3.2 The Impact of Color on Working Memory

Cause that non-recent positive (NP) and non-recent negative probes (NN) were free from the influence of PI in RP Task, analyses of responses to NN and NP provided us the result of color on WM performance.

3.2.1 Accuracy

An overview on descriptive measures about ACC of non-recent probes was provided in Table 3. A 3 (color: red, blue, and green) × 3 (response deadline: 200ms, 500ms, and 800ms) × 2 (probe type: positive vs. negative) analysis of variance (ANOVA) on accuracy scores revealed significant effect of color, [$F(2, 62) = 6.63$, $p < 0.05$, $\eta^2_p = 0.176$], a main effect of probe type, [$F(1, 31) = 25.92$, $p < 0.01$, $\eta^2_p = 0.455$], a main effect of response deadline [$F(2, 62) = 51.80$, $p < 0.01$, $\eta^2_p = 0.626$], and a significant interaction between color and probe type, [$F(2, 62) = 3.32$, $p < 0.05$, $\eta^2_p = 0.097$].

Follow-up pairwise comparisons revealed that ACC of blue words (M=0.92) were significantly higher than green words (M=0.89) under NP probes ($p < 0$ .05), which indicated that compared with green words, the ACC of WM performance was higher with blue words. In addition, NN were answered more correctly than NP under all three colors ($p < 0.001$). The ACC under 200ms (M=0.90) was reliably higher than 500ms (M=0.96) and 800ms (M=0.95), which showed that the AAC of WM performance under 200ms was higher than 500ms and 800ms.

Table 2. Means and standard deviations (in parentheses) of reaction times of negative probes in the RP Task

Probe condition	Red words			Blue words			Green words		
	200ms	500ms	800ms	200ms	500ms	800ms	200ms	500ms	800ms
RN	321.99 (61.72)	202.93 (33.86)	184.27 (24.85)	318.57 (57.23)	195.99 (34.31)	179.58 (40.25)	307.83 (51.51)	208.88 (42.85)	183.32 (37.78)
NN	287.57 (54.34)	193.64 (30.80)	177.95 (29.95)	279.88 (54.06)	193.63 (31.44)	181.71 (29.60)	275.5 (50.23)	196.71 (37.07)	180.92 (30.67)

Note:
RN means recent negative probes; NN means non-recent negative probes. Reaction times were displayed in milliseconds.

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Table 3. Means and standard deviations (in parentheses) of accuracy of non-recent probes in the RP task

Probe condition	Red words			Blue words			Green words		
	200ms	500ms	800ms	200ms	500ms	800ms	200ms	500ms	800ms
NN	0.93 (0.10)	0.98 (0.03)	0.98 (0.04)	0.94 (0.06)	0.98 (0.05)	0.99 (0.04)	0.93 (0.09)	0.99 (0.03)	0.98 (0.03)
NP	0.86 (0.14)	0.94 (0.08)	0.91 (0.1)	0.89 (0.1)	0.96 (0.08)	0.92 (0.12)	0.82 (0.13)	0.93 (0.08)	0.92 (0.12)

Note:
NN means non-recent negative probes; NP means non-recent positive probes.

3.2.2 Reaction Times

An overview on descriptive measures about RTs of non-recent probes was provided in Table 4. A repeated-measurements ANOVA with color (red, blue, and green)×response deadline (200ms, 500ms, and 800ms) × probe type (positives vs. negatives) revealed main effects of response deadline, [$F(2, 62) = 231.25$, $p < 0.01$, $\eta^2_p = 0.882$]. Follow-up pairwise comparisons revealed that RTs of non-recent probes under 200ms (M=284.19) were significantly longer than 500ms (M=195.41) and 800ms (M=181.72) ($p < 0.001$), which indicated that the RTs of WM performance under 200ms was longer than 500ms and 800ms.

4. Discussion

The present study explored the effects of color (red and green) on the buildup and resolution of PI. Results revealed that the reaction times of green words was significantly shorter than the red words under 200ms. There was no significant differences between the red and green words under 500ms and 800ms. In addition, the accuracy of blue words was significantly higher than green under NP probes. Detailed results were summarized and discussed in the following sections.

4.1 Effects of Color on the Buildup and Resolution of Proactive Interference

The comparison of responses to RN and NN provided us the result of color on PI, which showed that the RTs of green words was significantly shorter than the red words under 200ms, indicating that green might shortened but red prolonged the RTs when the PI buildup, which was a supplement to the "green supremacy effect " [4]. Studies revealed that color could convey emotion information [11]. Green was slightly associated with arousal and increased wellbeing and enjoyment, while red was relevant to threatening situations and high-arousal state [13,18]. Using RP Task, Levens and Phelps [19] found that the RTs of high-arousing negative trial were longer than low-arousing neutral trial, which were likely due to an avoidance effect associated with highly arousing negative stimuli that slowed response time. Therefore, compared with green, red with high-arousal might induce avoidance effect which need longer reaction times to inhibition the familiarity information.

In addition, the result showed that the difference between RN and NN under 200ms is bigger than 500ms and 800ms both in ACC and RTs, which indicated that the effect of PI is bigger under 200ms than 500ms and 800ms. The result confirmed previous study about the buildup and resolution of PI [8,9]. That is, when the probes were

Table 4. Means and standard deviations (in parentheses) of reaction times of non-recent probes in the RP task

Probe condition	Red words			Blue words			Green words		
	200ms	500ms	800ms	200ms	500ms	800ms	200ms	500ms	800ms
NN	287.57 (54.34)	193.64 (30.80)	177.95 (29.95)	279.88 (54.06)	193.63 (31.44)	181.71 (29.60)	275.5 (50.23)	196.71 (37.07)	180.92 (30.67)
NP	288.68 (45.92)	194.94 (32.18)	179.30 (31.13)	282.28 (43.84)	197.70 (29.03)	183.66 (36.97)	291.23 (50.25)	195.83 (27.65)	186.79 (30.19)

Note:
NN means non-recent negative probes; NP means non-recent positive probes. Reaction times were displayed in milliseconds.

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presented for 200ms, the buildup of PI could be observed, subjects were more likely to make mistakes and need longer reaction times to make a choice. When the probes were presented for 800ms, the resolution of PI could be observed, individuals were less likely to make mistakes and have shorter reaction times.

4.2 General Effects of Color on Working Memory

Analyses of the non-recent positive and non-recent negative probes were aim at studying the effect of color on WM performance. The result showed that the ACC of green words was lower than blue words under NP probes, which should be related to the color preference of adults. Some studies found that the overall color preference order of the adults was blue, red, green, yellow and so on.

Furthermore, the result showed that the impact of color on the PI and WM performance is different in RP Task, which was inconsonant with hypothesis. It implied that PI might constituted a relatively independent phenomenon with WM [20]. Hartshorne [21] found that PI only changed the visual WM capacity estimate by about 15%. Although the quality of WM was related to the buildup and resolution of PI, the processing mechanisms might be different to some degree. Moreover, the result showed that negative trials were answered more correctly than positive, which was consistent with the previous researches [15]. Namely, there was a competition between familiarity and contextual information for NP probes, which might result in the probability of false response. By contrast, NN probes will have low familiarity and no contextual tags linking them to the current target-set, which tended to yield right response because of no competition between two types of information.

In summary, the present study offered a unique contribution to the literature by showing the effects of color on the buildup and resolution of PI. Green aided memory by slowing down the PI buildup, while red impaired memory by speeding up the PI buildup, which provided an explanation for the facilitating effect of green on memory previously observed. In contrast to the effect of color on the buildup of PI, the present study indicated that color had no effect on PI resolution, which could give insight into the underlying mechanisms that modulate the interactions between color and memory. In addition, the results of the current study could be of considerable importance for applied fields as well, which suggested that it was necessary to take different effects of specific colors on information memory into account.

Finally, a few possible issues and further investigations were needed to be noted. Firstly, researchers found that words outstanding by color from the context had the better memory performance [11]. Our result showed that the accuracy was not remarkably different between red and green words under three deadlines. The reason might be that color was not perceptually outstanding in current experiment, which lead to a decreased discriminability between content-context bindings. Therefore, using color as a perceptually more salient signal to explore the effect of color on PI buildup and resolution would be an important avenue for future research. Besides, considering that accuracy of words in blue is highest in WM, in which blue did not play the role of control condition. Cultural cognition has reported that differences in color processing between individuals from East Asian and Western cultures [22], thus, changing control color for black or gray might be next direction of the research about color and PI.

Declarations

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Conflict of interest: The authors certify that the submission is original work and is not under review at any other publication and that there are no potential conflict of interest.

Ethics approval: All procedures performed in studies involving human participants were in accordance with the Ethical Committee of Capital Normal University.

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

Authors' contribution statements: All authors contributed to the study conception and design. Rong Liu and Weichun Du designed the study. Chenyuan Zhao, Weichun Du, Fengxia Su and Sixu Qiao collected and analyzed the experimental data. Rong Liu and Weichun Du wrote the article draft. Lixuan Feng analyzed the experimental data preliminary and proofreaded the article. Rong Liu revised and finalize the manuscript.

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ARTICLE

Diminished Health Returns of Own and Parental Education for Immigrants in the United States

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ABSTRACT

Background: Educational attainment is a strong social determinant of health. Marginalization-related Diminished Returns (MDRs), however, refer to smaller health effects of socioeconomic status, particularly educational attainment for marginalized groups compared to mainstream populations. While multiple studies have documented MDRs of educational attainment for racial, ethnic, and sexual minorities, there are no previous studies on MDRs of education among immigrants. **Aims:** To understand if the MDRs phenomenon also applies to immigrants, we compared immigrant and non-immigrant American adults for the effects of their own and parental educational attainment on subjective health. **Methods:** This study used a cross-sectional design and borrowed data from the General Social Survey (1972-2018). GSS is a series of nationally representative surveys in the U.S. Our analytical sample included 38,399 adults who were either non-immigrants (n = 34903; 90.9%) or immigrants (n = 3496; 9.1%). The main independent variables were own and parental educational attainment measured as four-level categorical variables. The dependent variable (DV) was poor subjective health, measured using a single item. Age, sex, marital status, and year of the survey were the covariates. Immigration status was the moderator. **Results:** Overall, individuals with higher educational attainment of own and parents reported better subjective health. We, however, found significant interactions between immigration status and both own and parental educational attainment on subjective health, which was suggestive of weaker protective effects of own and parental educational attainment against poor subjective health in immigrants than non-immigrant individuals. **Conclusions:** In the United States, immigrant adults experience poor subjective health disproportionate to their own and their parents educational attainment. That means we may observe worse than expected health of immigrants across all educational levels and social classes. Public policies should go beyond equal access to education by empowering marginalized people to leverage their education and secure better outcomes.

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1. Background

A large body of review [1] and empirical [2] research has shown different health statuses of immigrants compared to non-immigrants. Healthy immigrant effects [3-6] is suggestive that immigrants experience better health than non-immigrants because immigrants are a selected group of motivated and educated individuals who leave their country to pursue a better life condition in the destination country [7,8]. One major example of this phenomenon is the Hispanic Paradox [9-13]. According to the Hispanic Paradox [14-16], despite a lower socioeconomic status, Hispanics live longer than Whites in the U.S. [13,15,17]. On the opposite end, immigrants may experience additional adversities and may be at risk for a variety of undesired health outcomes [18,19]. At least some of the research on disparities have attributed these differences to lower education and poverty [20-22]. Very few studies, however, have ever tested if education differently impacts the health and well-being of immigrants and non-immigrants.

Education has protective effects on health through multiple mechanisms [23,24]. Each additional year of schooling enhances the sense of control, coping, and mastery, and reduces stress [25,26]. It also improves behaviors [27-31] and cognitive abilities [32-34], and reduces risky behaviors [35-37] that can deteriorate health. Education also enhances life conditions, reduces stress, and increases access to materialistic and non-materialistic resources such as a more powerful social network [25,26,28]. All these effects suggest that each additional year of schooling reduces the likelihood of many health risks [25,38,39]. While the health effects of education are not limited to one aspect of health, higher years of education and high educational credentials are associated with better subjective health [40-44], which is a robust indicator of the health of populations and individuals inside and outside clinical settings [45-47].

According to the Marginalization - related Minorities' Diminished Returns (MDRs) theory, [48-50], members of minority groups report worse health even when they have access to socioeconomic resources such as education [48-50]. The MDRs phenomenon is supported by an extensive body of empirical research for various health outcomes including but not limited to subjective health [51]. In the case of subjective health, MDRs literature has shown that subjective health remains poor in marginalized people such as middle-class racial [51,52] and ethnic [53,54] minorities as well as sexual minorities [55]. The MDRs framework proposes that: (a) social inequalities in subjective health and other health outcomes are not all due to low SES (e.g., low education) of marginalized social groups, but at least some of these inequalities are due to smaller marginal returns (i.e., health effects) of available SES indicators for the member of the marginalized social groups (i.e., MDRs). Given that the gradient/slope of the effect of years of education of oneself [51] and parents [56] on health outcomes such as subjective health [51,53,57] are systematically weaker in marginalized compared to non-marginalized groups, the gap between the subjective health between the two widens, rather than narrows, as SES (years of education) increases. In this view, quite contrary to traditional views, SES (e.g., education) may become a source rather than a solution to inequalities [58-61], unless policies are in place that can equalize not only education but also gains from education for social groups. That means we would need policy solutions to eliminate inequalities that go beyond requiring access to SES by addressing structural and societal stressors and barriers that have historically influenced communities of color and marginalized people [48-50].

Although MDRs are documented for subjective health [51,53,62] of middle-class Blacks [63], Hispanics [64], Native Americans, Asian Americans, and lesbian, gay, bisexual, and transgender (LGBT) individuals[36,55,66], we are not aware of any literature on MDRs that goes beyond race, ethnicity, and sexual orientation and tests the relevance of MDRs to immigrants. Similar to the racial, ethnic, and sexual minorities, immigrants are marginalized and discriminated against. Immigrants also experience economic and social adversities. Some immigrants even experience high levels of prejudices and hate crimes [67-71]. Immigrants are also more likely to live in poor urban areas with a concentration of poverty and sometimes ethnic enclaves [67,72]. These immigrants are systematically excluded from the labor market [73-77], and their education may not generate the same outcomes [74,75,78-81]. Similarly, immigrants face environmental stressors and exposures that can potentially reduce the gain of their resources. As in theory, immigrants are a minority and marginalized group in society (social status), and as the MDRs framework applies to all marginalized groups, broadly defined [82,83], more research is needed on the relevance of MDRs for immigrant people.

Aims

To better understand the mechanisms by which health inequalities impact immigrants, and are informed by the MDRs theory [82,83], we compared immigrants and non-immigrants to assess the association between educational

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attainment and subjective health in U.S. adults. Built on a national sample of Americans, we hypothesized that the protective effect of each additional year of schooling (educational attainment) on subjective health would be smaller for the immigrants compared to non-immigrant people. If MDRs are relevant to immigrants as well, we would expect poor subjective health in highly educated immigrant people, a pattern very different than highly educated non-immigrants.

2. Methods

2.1 Design and Setting

In a cross-sectional study, we used the General Social Survey (GSS; 1972-2016) data. Since 1972, the GSS has been conducted by the University of Chicago to monitor the social trends in the U.S. over time.

2.2 General Social Survey (GSS)

The GSS has gathered data on contemporary American society over more than four decades and monitored trends in attitudes, behaviors, and beliefs of Americans. The GSS sheds light on how the structure and function of the U.S. society are changing, overall, and across social groups (e.g., race, class, sex, and immigration status). The data also provides an excellent opportunity to run a time series and compare U.S. subgroups. Finally, the data gives us the opportunity to compare the United States to its peer industrial countries [87].

2.3 Analytical Sample

The current study included 38,399 adults who were either non-immigrants (n = 34903; 90.9%) or immigrants (n = 3496; 9.1%).

2.4 Ethics

The GSS study protocol was approved by the University of Chicago Institutional Review Board (IRB). All GSS participants provided informed consent. The study was funded by the National Science Foundation (NSF).

2.5 Study Measures

Study variables included immigration status, race/ethnicity, age, sex, own educational attainment, parental educational attainment, employment status, marital status, year of survey, and subjective health.

Own Educational Attainment. Own educational attainment was measured as years of schooling that the individual had completed. This variable was a continuous measure varying from 0 to 22. It was treated as an interval measure (a higher score reflecting higher educational attainment/ years of schooling).

Parental Educational Attainment. Educational attainment of the parents was measured as years of schooling of the mothers and fathers, varying from 0 to 22. It was treated as a continuous measure (a higher score reflecting higher educational attainment/ years of schooling).

Subjective health. Participants reported their subjective health using the conventional single-item measure (self-rated health / SRH). The item was, "Would you say your own health, in general, is excellent, good, fair, or poor?" Responses were excellent, good, fair, or poor. We dichotomized the outcomes with poor as one and all other responses as 0. Idler and others have shown that subjective health is a valid predictor of mortality risk in the general population [45,47].

Demographic Variables. Sex, age (years), and year of the survey were the study covariates. Age was a continuous variable in years. Sex was 0 for males (reference group) and 1 for females.

Study Year. The year of the survey was operationalized as a continuous variable with a range from 0 to 40.

Socioeconomic Status. Two SES covariates in this study were employment [84,85]and marital status [86,87]. Employment was measured as an ordinal variable, with categories: "(1) Working Full-time, (2) Working Part-time, (3) Temporarily Not Working, (4) Unemployed, Laid Off, (5) Retired, 6) School, 7) Keeping House, and 8) Other". Working Full-time was coded as 1 and all other statuses as the reference group. Marital status was also assessed as a nominal variable with two categories: (1) Married, (2) non-Married. Married was coded as 1 and all other statuses as the referent category.

Race/ethnicity. Self-identified race and ethnicity were the focal moderating variable, with three categories. Race/ethnicity was treated as a variable with non-Hispanic Whites as the reference group =0, Blacks as 1, and other race/ethnic groups as 2.

2.6 Statistical Analysis

Data were analyzed using Stata 15.0. Only participants with available data on immigration and subjective health were eligible for this analysis. No missing data were present. We reported frequency (%) and mean (standard error; S.E.) to describe our participants overall and by race. For multivariable analysis, logistic regressions were used because our outcome was dichotomous, and SRH is commonly treated as a dichotomous outcome. We also ruled out collinearity between our study variables. We used four logistic regressions, two models in the

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pooled sample (*Model 1* and *Model 2*) and two models specific to our nativity groups (*Model 3* and *Model 4*). In all models, poor subjective health (1 poor health, 0 any other health status) was the primary outcome (dependent variable), own and parental educational attainment (years of education) as the primary predictors (independent variables), and age, sex, employment status, marital status, and year of the survey as covariates. *Model 1* only had the study variables without any interaction terms. *Model 2* also included the race by educational attainment interaction term. Finally, *Model 3* and *Model 4* estimated the effects of own and parental educational attainment on poor subjective health in non-immigrants and immigrants, respectively. Although models 3 and 4 had different statistical power, our main model is Model 2, which is not affected by the imbalanced sample size of immigrant and non-immigrant populations. Odds Ratio (OR), S.E., 95% CI, and p values were reported.

3. Results

3.1 Descriptive Statistics

The current study included 38,399 adults who were either non-immigrants (n = 34903; 90.9%) or immigrants (n = 3496; 9.1%). These participants were recruited between 1977 and 2018. Participants were between 18 and 88 years old. Participants were 45.99 years old on average (SD = 17.30). On average, immigrants were younger than non-immigrants. Immigrants reported better subjective health compared to non-immigrants. Immigrants had higher educational attainment of own and parents compared to non-immigrants. Table 1 described the sample overall and by immigration status.

3.2 Multivariable Models in the Pooled Sample

In Table 2 we see the summary of the results of two logistic regression models with own and parental

Table 1. Descriptive statistics in the overall sample

	All		Non-Immigrants		Immigrants	
	N	%	N	%	N	%
Immigration						
No	34903	90.9	34903	100.0	-	-
Yes	3496	9.1	-	-	3496	100.0
Race*a						
White	30336	79.0	28408	81.4	1928	55.1
Black	5740	14.9	5317	15.2	423	12.1
Others	2323	6.0	1178	3.4	1145	32.8
Sex*a						
Women	16822	43.8	15240	43.7	1582	45.3
Men	21577	56.2	19663	56.3	1914	54.7
Marital Status*a						
Others	19189	50.0	17611	50.5	1578	45.1
Married	19210	50.0	17292	49.5	1918	54.9
Own Educational Attainment *a						
0-11	22380	58.3	20271	58.1	2109	60.3
12	8203	21.4	7618	21.8	585	16.7
13-15	3004	7.8	2761	7.9	243	7.0
16+	4812	12.5	4253	12.2	559	16.0
Parental Educational Attainment*a						
0-11	6508	16.9	5653	16.2	855	24.5
12	11314	29.5	10582	30.3	732	20.9
13-15	9532	24.8	8797	25.2	735	21.0
16+	11045	28.8	9871	28.3	1174	33.6
subjective health*a						
Other	36249	94.4	32909	94.3	3340	95.5
Poor	2150	5.6	1994	5.7	156	4.5
	Mean	SD	Mean	SD	Mean	SD
Age (Years)*b	45.99	17.30	46.19	17.42	44.04	16.00

Notes:
** $p < 0.05$ for comparison of non-immigrants and immigrants*
a: Chi Square test
b: independent samples t test

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Table 2. Summary of logistic regressions on subjective health in the pooled sample

	Model 1 Main Effects						Model 4 M1 + Interactions					
	b	SE	OR	95% CI		p	b	SE	OR	95% CI		p
Immigrants	-0.32	0.09	0.72	0.60	0.87	.001	-0.65	0.14	0.52	0.39	0.69	.000
Race/Ethnicity												
White			1						1			
Blacks	0.22	0.06	1.25	1.11	1.41	.000	0.21	0.06	1.23	1.09	1.39	.001
Other race ethnic groups	0.25	0.11	1.28	1.04	1.59	.020	0.25	0.11	1.28	1.04	1.58	.022
Sex (female)	-0.01	0.05	0.99	0.90	1.09	.847	-0.01	0.05	0.99	0.90	1.09	.851
Age (Years)	0.03	0.00	1.03	1.03	1.04	.000	0.03	0.00	1.03	1.03	1.04	.000
Marital Status (Married)	-0.44	0.05	0.64	0.58	0.71	.000	-0.44	0.05	0.64	0.59	0.71	.000
Own Educational Attainment						.003						.001
<12 Years												
12 Years	-0.20	0.07	0.82	0.71	0.94	.005	-0.24	0.07	0.78	0.68	0.91	.001
13_15 Years	-0.36	0.13	0.70	0.54	0.90	.006	-0.36	0.13	0.70	0.53	0.91	.007
16+ Years	-0.19	0.11	0.83	0.66	1.03	.085	-0.27	0.12	0.76	0.60	0.96	.022
Parental Educational Attainment						.000						.000
<12 Years												
12 Years	-0.79	0.06	0.45	0.40	0.51	.000	-0.83	0.06	0.43	0.38	0.49	.000
13_15 Years	-1.04	0.07	0.35	0.31	0.40	.000	-1.08	0.07	0.34	0.29	0.39	.000
16+ Years	-1.44	0.08	0.24	0.20	0.28	.000	-1.46	0.09	0.23	0.20	0.28	.000
Time (0_20)	0.01	0.00	1.01	1.00	1.01	.001	0.01	0.00	1.01	1.00	1.01	.000
Immigration × Own Educational Attainment												.083
<12 Years	-	-	-	-	-	-						
12 Years	-	-	-	-	-	-	0.51	0.26	1.66	1.00	2.75	.049
13_15 Years	-	-	-	-	-	-	0.01	0.55	1.01	0.35	2.97	.980
16+ Years	-	-	-	-	-	-	0.70	0.34	2.01	1.03	3.91	.040
Immigration × Parental Educational Attainment												.123
<12 Years	-	-	-	-	-	-						
12 Years	-	-	-	-	-	-	0.53	0.23	1.70	1.08	2.66	.022
13_15 Years	-	-	-	-	-	-	0.36	0.27	1.43	0.84	2.43	.183
16+ Years	-	-	-	-	-	-	0.15	0.30	1.16	0.64	2.10	.620
Intercept	-3.67	0.11	0.03			.000	-3.63	0.11	0.03			.000

Notes:
CI: Confidence Interval; S.E.: Standard Error; OR: Odds Ratio

educational attainment as the independent variables and poor subjective health as the dependent variable. Both models run in the pooled / total / overall sample. *Model 1* only entered the main effect of own and parental educational attainment, immigration status, and covariates. *Model 2*, however, also added two interactions between immigration status and own and parental educational attainment. Based on *Model 1*, high own and parental educational attainment were associated with lower odds of poor subjective health. *Model 2* showed statistically significant interactions between immigration status and own and parental educational attainment on poor subjective health, suggesting that high educational attainment of own and parents have diminished effects subjective health of immigrants than non-immigrant individuals (Table 2).

3.3 Multivariable Models in Immigrant and Non-immigrant Individuals

Table 3 presents the results of two other logistic regression models with own and parental educational attainment as the independent variables and poor subjective health as the dependent variable. *Model 3* and *Model 4* were estimated in non-immigrants and immigrants, respectively. Based on *Model 3,* high educational attainment of own and parents were associated with better subjective health in non-immigrant individuals. *Model 4* showed that parental education attainment but not own educational attainment is associated with higher odds of better subjective health in immigrant individuals (Table 3).

4. Discussion

High own and parental educational attainment was

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Table 3. Summary of logistic regression models on subjective health by immigration status

	Model 3 Non-Immigrants						Model 4 Immigrants					
	b	SE	OR	95% CI		p	b	SE	OR	95% CI		p
Race/Ethnicity												
White			1.00						1.00			
Blacks	0.19	0.06	1.21	1.07	1.37	.003	0.63	0.26	1.87	1.12	3.12	.016
Other race ethnic groups	0.27	0.13	1.32	1.02	1.69	.032	0.48	0.22	1.62	1.06	2.48	.025
Sex (female)	-0.02	0.05	0.98	0.89	1.08	.720	0.17	0.18	1.18	0.83	1.68	.349
Age (Years)	0.03	0.00	1.03	1.03	1.03	.000	0.05	0.01	1.05	1.04	1.06	.000
Marital Status (Married)	-0.41	0.05	0.66	0.60	0.73	.000	-0.70	0.18	0.50	0.35	0.71	.000
Own Educational Attainment						.000						.203
<12 Years			1.00						1.00			
12 Years	-0.26	0.07	0.77	0.67	0.89	.001	0.28	0.25	1.32	0.81	2.16	.267
13_15 Years	-0.38	0.13	0.68	0.52	0.89	.005	-0.20	0.54	0.82	0.29	2.35	.715
16+ Years	-0.29	0.12	0.75	0.59	0.94	.014	0.62	0.33	1.86	0.98	3.53	.059
Parental Educational Attainment						.000						.001
<12 Years			1.00						1.00			
12 Years	-0.85	0.06	0.43	0.38	0.48	.000	-0.22	0.23	0.80	0.51	1.26	.340
13-15 Years	-1.10	0.07	0.33	0.29	0.38	.000	-0.61	0.27	0.54	0.32	0.92	.023
16+ Years	-1.48	0.09	0.23	0.19	0.27	.000	-1.17	0.30	0.31	0.17	0.55	.000
Time (0-20)	0.01	0.00	1.01	1.00	1.01	.000	0.00	0.01	1.00	0.98	1.01	.648
Intercept	-3.56	0.11	0.03			.000	-5.26	0.45	0.01			.000

Notes:
CI: Confidence Interval; S.E.: Standard Error; OR: Odds Ratio

associated with better subjective health. However, these effects were both weaker for immigrants than non-immigrants. In line with MDRs, high educational attainment of oneself and parents seemed to have diminished effects on boosting the subjective health of immigrant people than non-immigrant individuals.

Similar to our recent findings, Ferraro showed that the slope of the effect of education on subjective health is weaker in Black than White adults [46]. In a previous study using data from HINTS with a national sample of American adults, a weaker effect of education on subjective health was found for Blacks than Whites [51]. In this study, income mediated this differential return of education, suggesting that labor market discrimination may have a role in explaining the MDRs of education by race [51]. In another study in a local sample of Michigan residents, income generated more mental subjective health for White than Black adults [62]0. In another study, parental income at birth generated less subjective health for Black than White 15-year-old youth [52]. In another study, parental SES generated more oral subjective health for Hispanic than non-Hispanic adults [53]. Another study showed diminished returns of SES on the subjective health of Hispanic than non-Hispanic older adults [54]. Finally, LGBT individuals with high SES reported worse subjective health than their non-LGBT counterparts [55]. All of these suggest that racial, ethnic, and sexual minority people report poor subjective health even when they have access to education and income. The major contribution of this paper is to extend this literature to immigrants suggesting that immigrants also experience MDRs of education similar to Blacks, Hispanics, and sexual minority people.

An extensive body of research on MDRs has shown that high educational attainment has smaller health effects on marginalized people compared to the mainstream people [56,63,64,66]. As a result, people show worse than expected outcomes even when they have access to SES if they do not belong to the mainstream and privileged groups. Marginalized people do not report poor health merely because they have low access to resources. They also report poor health because their resources generate less economic and health outcomes.

This study was on the education - subjective health link. Immigrants are less likely than non-immigrants to report any suffering from chronic health issues and delay their use of health care, contributing to lower self-reported health and mental status. MDRs, however, are neither limited to education nor to subjective health [82, 83]. Similar patterns of MDRs are shown for education [51], income [88], employment [89], and marital status [90]. Various outcomes such as obesity [91], depression [92], anxiety [90], self-rated health [51], and chronic disease [93] also show MDRs. That is, regardless of the SES indicator and outcome, and

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regardless of the type of marginalization (race, ethnicity, sexual orientation, or immigration), SES generates less tangible health outcomes for marginalized groups.

Marginalization, broadly defined, reduces the marginal return of SES, particularly education. This applies to LGBT people [66], Blacks [62], Hispanics [64,94], and Native Americans [65]. This is, however, one of the first studies on MDRs of educational attainment for immigrants. The next step is to study why we observe MDRs for education on the subjective health of immigrants. We also need to study if the same pattern can be seen for chronic disease and other objective measures of health, such as disability. Further studies should examine the effect of SES factors, including education, and its relationship with immigration-related variables, such as country of origin, migration history, and length of immigration residency to fully understand the complex effect of immigration and immigrant status on overall health.

Universal MDRs are due to structural and contextual rather than behavioral and cultural factors. We, however, need to study mechanisms that can potentially explain why educational attainment and other SES indicators lose some of their protective effects for marginalized people in general and immigrants in particular. Underlying mechanisms of MDRs in populations may be stigmatization, marginalization, segregation, prejudice, and discrimination. These social processes increase stress and reduce opportunities to leverage available resources. In such contexts, it is difficult to translate available resources and mobilize human capital to secure outcomes [66]. For immigrants as well as racial and ethnic minority groups labor market discrimination is a well-known mechanism [51]. Under unequal treatment, educational attainment does not lead to equal outcomes across groups of individuals. So, marginalized people still suffer poor health even when they are highly educated. The same pattern is shown for undesired behaviors [48,50,95], mental health [62], and physical health [91,96].

4.1 Implications

According to the results of this study, to eliminate health disparities in marginalized groups such as immigrants, there is a need for public rather than health policies. Such policies should go beyond merely focusing on equalizing access to addressing barriers that reduce societal problems in the daily life of marginalized people, such as the marginal return on education for them. It should be a strategic priority for the U.S. government and local states to reduce inequalities in the returns of education. Under the current social structure, education serves the most privileged groups, most and the least privileged groups least. Unless we equalize how groups are treated by society, we cannot expect the very same education to generate the same outcome. Thus, we can infer that the reason for some health disparities goes beyond a gap in access to resources. We argue that while efforts should be made to equalize access, there is a need for specific policies aimed at ensuring that access to the same resources will generate comparable outcomes for groups. This requires equal access to job opportunities, societal resources, education, health insurance, as well as public transportation. The focus of such policies should be to eliminate or reduce social stratification, colorism, segregation, prejudice, and societal exclusion of marginalized groups. Such policies may generate equitable outcomes across various social groups with access to identical resources such as education.

4.2 Limitations

This study has a few methodological limitations. Similar to most other papers on MDRs, cross-sectional design and data do not allow any causal inferences. The sample size was imbalanced, with most participants being non-immigrants. As a result, our *Model 3* had higher statistical power than *Model 4*. We, however, did not exclusively rely on *Model 3* and *Model 4*, as our interaction effect in *Model 2* was not affected by statistical power and imbalanced sample size across groups. We did not include income, occupation, details of health data, chronic disease, as well as area-level SES. Although immigrant and non-immigrant people differed in age, we controlled for age. Neighborhood characteristics may partially explain why MDRs exist. Despite these limitations, this study extends what we already know about MDRs and marginalization. For the first time, we observed that MDRs also apply to immigrant populations. GSS is also a robust study with a large and generalizable sample.

4.3 Conclusion

In the United States, the magnitude of the association between own and parental educational attainment and subjective health is unequal between immigrant and non-immigrant people, and immigrants seem to be at a relative disadvantage compared to non-immigrants. That means, highly educated immigrants still experience poor subjective health to a level that is disproportionate to their SES. Health equity is not achievable unless we equalize the health and economic returns of resources across populations. True equality is not just equality in access to education but similar opportunities to translate resources such as education into tangible outcomes. We should

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empower immigrants and other socially marginalized groups to better translate their resources to health.

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Conflicts of Interest

The authors declare no conflict of interest.

Author Contributions

S.A. conceptualized the study, analyzed the data, prepared the first draft of the paper, and acquired the funding. A.C. contributed to the conceptualization of the paper and revised the paper. Both authors approved the final draft.

Appendix: Year of the Survey Overall and by Nativity

	All		Non-Immigrants		Immigrants	
Year	n	%	n	%	n	%
1977	1526	4.0	1422	4.1	104	3.0
1980	1464	3.8	1360	3.9	104	3.0
1982	1855	4.8	1754	5.0	101	2.9
1984	1455	3.8	1368	3.9	87	2.5
1985	1529	4.0	1435	4.1	94	2.7
1987	1806	4.7	1704	4.9	102	2.9
1988	976	2.5	910	2.6	66	1.9
1989	1026	2.7	950	2.7	76	2.2
1990	906	2.4	850	2.4	56	1.6
1991	980	2.6	918	2.6	62	1.8
1993	1069	2.8	992	2.8	77	2.2
1994	1970	5.1	1827	5.2	143	4.1
1996	2416	6.3	2219	6.4	197	5.6
1998	2809	7.3	2567	7.4	242	6.9
2000	2318	6.0	2092	6.0	226	6.5
2002	1845	4.8	1676	4.8	169	4.8
2004	1355	3.5	1230	3.5	125	3.6
2006	2000	5.2	1734	5.0	266	7.6
2008	1351	3.5	1165	3.3	186	5.3
2010	1277	3.3	1121	3.2	156	4.5
2012	1305	3.4	1124	3.2	181	5.2
2014	1710	4.5	1463	4.2	247	7.1
2016	1883	4.9	1645	4.7	238	6.8
2018	1568	4.1	1377	3.9	191	5.5

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ARTICLE

Marital Stress and Married Working Women in Nigeria: the Role of Coping Strategies, Self-Concept and Educational Qualification

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ABSTRACT

In this 21st century a lot of women are experiencing marital challenges due to the various and important roles they perform in the home and in the society, which may require some psychological remedies. The research was on marital stress and married working women: the role of coping strategies, self-concept and educational qualification. Three hundred and seventy-seven (377) participants whose ages were between 25 to 55 years (mean 40.63 and SD 7.59) participated in the study. Three research instruments were used for data collection while three-way Analysis of Variance was used for data analysis. Result disclosed that emotion-focused strategies yielded less manifestation of marital stress (1, 369) = 4.44, sig. = .036; in the same manner, those with higher educational qualification presented less manifestation of marital stress (1, 369) = 6.33, sig. = .012. It was equally specified that coping strategies together with self-concept had a joint impact on marital stress (1, 369) = 5.88, sig. = .016; a joint influence was also observed between self-concept and educational qualification on marital stress (1, 369) = 4.18, sig. = .042. Hence, married working women should strive for higher education and also use emotion-focused coping strategies in dealing with marital stress.

1. Introduction

The globalization of the world opened up the human horizon in all aspects of existence. Societies that were seemingly closed are beginning to be opening up. Women (particularly married women) in most societies, especially in Africa who were confined to the home as housewives are now taking up jobs outside their homes. Thus, they perform reproductive, domestic and productive duties. For instance, in the African traditional family settings, sex roles were defined; men were solely in-charge of providing for the family. Women on the other hand, were responsible for child bearing and house chores. The recent happening is that everyone whether man or woman works tirelessly in order to provide for the family. Also, the researcher has encountered and is still encountering marital stress mostly from homes and in work place, her interaction with other men and women proved that it seems everyone is experiencing marital stress at varied degrees. Manifestation of marital stress is a situation where some issues in marriage interact with the job requirements to exert some psychological discomforts

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on married workers especially women. A woman who is gainfully employed or self-employed may show cognitive sign of stress by procrastinating some of her sex-roles like when to start giving birth as to retain her job. Situations like this may cause a woman to post date when to commence child birth and or how to take care of her children which may lead to disagreement especially if the spouse is not supportive. But when women receive affectionate behaviour from their partners, it lessens their worries and fears which increase their marital satisfaction [1]. To further portray the frustration, some women may show some signs of agitation, inability to relax, etc. which may lead to marital stress. As problems persist, communications generally become more difficult. Marital stress may affect couples as follows: chronic sickness, misperception, and uncontrollable crisis that may lead to divorce or separation.

Marital stress adverse outcomes were caused primarily by deficits in problem-solving, and also from a combination of factors like enduring vulnerabilities, stressful events and poor adaptive processes [2]. Enduring vulnerabilities in the sense that some persons have a problematic personality such as neuroticism and also are from violent family background, such persons if married may be predisposed to suffer marital stress. Stressful events as seen in the above definition are characterized by some vital events like getting married and or getting a new job while poor adaptive processes entail lack of support from one's spouse and lack of adequate problem-solving skills. According to [3] marital stress involves issues of minor life events like time spent together, lack of frequent communication, inadequate money or foodstuff in the house, etc. They stressed that these minor impacts culminate into marital stress especially when the source is external (happening outside the marriage but bearing its effect on the family). In African setting where communal kind of lifestyle is still predominant minor issues like quarrels from the in-laws can bring about stress in marital unions among couples. Again, [4] assumes that stress occurs in any of these three contexts: when people experience loss of resources, when resources are threatened or when people invest their resources without subsequent gain. Examples of these resources include: home, clothing, employment, skills, etc.

The consequences of marital stress on married working women especially when the spousal support is limited are enormous. The woman may neglect some of her core sex-roles, including physical look thus resulting to lesser attraction to her husband. This factor may increase the emergence of the woman sharing the husband with other side wives or chicks, begetting other step children and even losing the husband completely to other competitors. There could be issues with effective communication since the woman spends sometime in the work place, the husband may utilize this opportunity badly which may result in another relationship mostly with the house helps, such cases abound in Nigeria. Married working women especially in "Igbo land" Nigeria are expected to leave up to the core traditional sex-roles like caring for the children and cooking for the family. At some time because the woman is not self-employed, she may not measure up with the above expectation thus making her prone to other forms of problems particularly from in-laws (mother in-law) who always complain that the woman is lacking as a wife, this alone may result to other serious issues (marital stress). The married working woman may miss here promotion or serious managerial position in some establishment just because she is married and could not meet up with some appraisal requirements at the moment. The researcher who is also a Nigerian married working woman has experienced this personally.

This married working woman may have issues with the choice of parenting styles (authoritarian, authoritative or permissive) to adopt in her home since she is not solely in charge of her children upbringing. This may further leave her with the trauma of the children's abuse, coming from the unsupportive spouse, house help(s), neighbours and relatives, such memories if not addressed properly may further endanger the family happiness. The researcher encountered one married female banker who resigned and is still nursing her regrets for leaving the children in the hands of house helps while at work plus other similar cases. The woman who usually serve as the primary caregiver to her child may in this instance, be a secondary caregiver and this may affect the attachment/bonding met for mother and child which may further endanger the child/mother overall relationship when the child becomes an adult. The above factor may contribute to the level of neglect witnessed between some children and their aged parents (mother) in Nigeria. The married working woman may face a lot of issues ranging from inadequate finance to both physical and mental health problems. At this juncture, the disastrous nature of marriage related problems appears to rely on some variables like making headway skills, self-concept and educational qualification of married women especially those that are working.

1.1 Coping Strategies

Making headway (coping) entails available assets together with coping mechanisms which is handy for the termination, adjustment and or handling of taxing moments on the other hand critical period [5]. How married working

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women respond to the stresses of going to work and catering for their families rely on many issues mediating on the resources they have (husbands' support, house helps, welfare packages in their work places, etc.). Other things that may attenuate marriage related stressors are help received from members of one's family (both immediate and extended), availability of finance and sound knowledge towards new skills in dealing with marriage related issues.

1.2 Types of Coping

This research addressed two forms of coping skills: problem-focused (making headway on altering the sources of stress), and emotion-focused (aimed at managing negative emotional disturbances orchestrated by stress) as summarized by [6]. Married working women who used problem-focused coping styles may identify what the issue entails and learning new ways of dealing with it. Whereas, those that engage in emotion-focused coping styles having identified the issue flee from identifying new ways of solving it, but rather use things like distraction, escape or dissociation to easy off temporarily instead of addressing the problem.

1.3 Self-concept

Another factor that may influence marital stress in this study is self-concept. [7] defined self-concept as reflecting the collection of social roles played by the individual. There is a negative correlation between self-concept and marital stress as opined by [8]. It then suggests that as a woman's self-concept increases, her marital stress decreases, and vice versa. It is ideal to say that married working women need to develop high self-concept in order to keep marital stress at it minimal. In this research, two kinds of self-concept are of interest. These are high self-concept and low self-concept. Therefore, self-concept is your own mental picture of yourself. [9] sees it as how we think of ourselves and how we should think, behave and act out our various life roles.

1.4 Educational Qualification

Educational qualification was also studied as a factor that might influence marital stress, which refers to the formal education one has acquired, or the literacy attainment of the participants. In the researcher's country these educational qualifications may include: any certificate that marks the completion of primary and secondary education as low educational qualification, and certificates awarded to the students at the completion of higher education from Colleges of education, Polytechnics and Universities as high educational qualification.

1.5 Significant of the Study

In summary, the study intends to reveal whether coping-strategies, self-concept and educational qualification will independently or jointly influence marital stress of married working women. Specifically, the aims were: (1) To determine if coping strategies will significantly influence marital stress among married working women, (2) To find out whether self-concept will significantly influence marital stress among married working women, (3) To investigate if educational qualification will significantly influence marital stress among married working women, (4) To find out if coping strategies and self-concept will have a joint impact on marital stress of married working women, (5) To examine whether coping strategies and educational qualification will have a joint impact on marital stress of married working women, (6) To determine if self-concept and educational qualification will have joint impact on marital stress of married working women and (7) To see whether coping strategies, self-concept and educational qualification will have interaction impact on marital stress of married working women.

1.6 Statement of the Problem

The involvements of women in both economic and domestic responsibilities seem to have placed a heavy burden on their shoulders hence the phenomena of marital stress, thus the need to ascertain how these modern women are coping with the challenges. Studies have shown that coping strategies help to moderate stress and are also influenced by self-concept and educational qualification. But majority of the research investigating the influences of those constructs were done outside the Nigeria culture, the researcher deemed it necessary to study this in her environment. Hence, the research problems were:

(1) Will coping strategies significantly influence marital stress among married working women?

(2) Will self-concept significantly influence marital stress among married working women?

(3) Will educational qualification significantly influence marital stress among married working women?

(4) Will coping strategies and self-concept have a joint impact on marital stress of married working women?

(5) Will coping strategies and educational qualification have a joint impact on marital stress of married working women?

(6) Will self-concept and educational qualification have joint impact on marital stress of married working women?

(7) Will coping strategies, self-concept and educational qualification have interaction impact on marital stress of married working women?

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2. Literature Review

Vulnerability-stress-adaptation model [10], in a framework designed to expand beyond the prevailing view that adverse marital outcomes were caused primarily by deficits in problem-solving, hypothesized that marital distress and dissolution emerge from the combination of: (a) enduring vulnerabilities (e.g., problematic personality traits such as neuroticism, turbulent family of origin), (b) stressful events (e.g., major life events, stressful circumstances, normative transitions), and (c) poor adaptive processes (e.g., inability to empathize with and support the partner, defensive, hostile, and disengaged problem-solving skills). Thus, according to this vulnerability-stress-adaptation model, distress and dissolution are most likely to the extent that spouses who enter marriage with a high degree of enduring vulnerabilities marry to form couples that possess poor adaptive processes; subsequently these couples encounter high levels of stress.

Marital quality is assumed to fluctuate downward with acute life events, and these fluctuations are expected to be especially large when chronic stress is high [11]. One's ability to cope with marital stress may depend on some family variables, problem-solving skills involving high educational qualification and having high self-confidence in one's strength. Therefore, it is believed that any shortcomings in the above-mentioned circumstances will definitely land the couples in conflicts and possible divorce and might affect married working women either positively or negatively. However, the theory did not take in considerations the issues of minor life events like time spent together and lack of frequent communication as they might bring about stress in marriages. Vulnerability-stress-adaptation model of marital stress was chosen in explaining the study construct because it has links to the three independents factors in this study (coping strategies, self-concept and educational level).

Theory of Developmental Life Cycle: Theory of human development according to [12] posits that human beings pass through stages as they grow and develop. Erickson went on to state that each stage has a developmental task the individual must accomplish and this task requires the adoption of coping strategies.

Psychosocial stages of human development posit that adequate resolution of the issues that occur at one stage in the life cycle leaves a legacy of coping resources that can help to resolve subsequent crises [12]. According to the above author, failure to attain one landing implies failure to attain the next. It was noted that, the circumstances operating in one's life at a particular time determine the coping strategy one adopts to go through [13].

This theory posits that adult personality including coping skills are affected by various stages of growth and development one passes through in life, couples' marital satisfaction/stress may also be affected by what happens in their various stages of growth and development.

For instance, married working women at any stage of psychosocial development will device the coping strategies to adopt in reaction to marital stress. It is more likely that they make use of problem-focused and emotion-focused coping strategies interchangeably in the face of marital stress and at varied stages. These coping behaviours may be inform of seeking social support especially at their work places or taking action to get rid of the problem. Thus, working women may borrow money from their work places or even ask for salary advance in order to tackle an imminent financial problem facing the family. Some others may resort to other coping behaviours such as disclaiming or escape-avoidance. In the face of serious financial difficult, they may use pent-up emotions such as distracting oneself and or managing hostile feelings in order to eliminate marital stress temporary.

In contrast, the above theory fails to address the fact that married working women have the tendencies to adapt to the present situation in their current stage of development without regard to what happened in their earlier stage(s).

Social Comparisons Theory of Self-concept: [14] saw feedback from others as being important in the development of the self-concept. According to him, the self-concept is like a looking-glass, reflecting what we believe other people think of us. This looking-glass self includes both evaluative and illustrative dimensions: Evaluative dimensions are the judgments that we believe other people are making about us, and illustrative dimensions are what we believe they see when they look at us. Thus, it is not just a question of how people respond to our actions - we are also forming our opinion of ourselves on the basis of what we think other people think. (14) believed that feelings such as pride, embarrassment and even anger arise directly from these ideas we have about how other people perceive us.

According to [15] social comparison serves an understanding function and a self-enhancement function. When individuals feel inadequate, they are likely to make downward comparisons with those who are less adequate or accomplished. If individuals are seeking self-improvement, they are more likely to make an upward comparison to people slightly better than them on that particular domain, hence inspiring them to improve. Individuals desiring a realistic assessment of themselves make both upward and downward comparisons in an attempt to form a valid as-

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sessment [16].

Married working woman who applies this theory may be managing her marital stress/job stress properly due to the quest for self-improvement in which she makes upward comparison to someone slightly better than her in family life or in the work place. The awareness of others in the same category passing through similar stress situation may propel the woman to develop positive self-concept. Similarly, a woman who feels inadequate is likely to make downward comparisons with those who are less adequate or accomplished; as a result, the woman may develop positive self-concept for the awareness of being better than some other people. But when the outcome of both comparisons (upward and downward) is seen as a deficiency it may lead to negative self-concept which may likely put a limit to someone's level of adjustment hence marital stress may be obvious.

This theory argued that people compare themselves with others and use the information to develop an idea of what they are like, these comparisons determine one's self-concept either high or low, while the weakness is that other peoples' judgments or believes are most of the time not true of our real self. Hence, one should not develop low self-concept because of mere judgments of others.

This theory also fails to address the fact that our self-concept is not limited to social comparisons but involves the totality of one's unique qualities, social roles, personality, etc.

Interaction (Transactional) Theory of Stress: Transactional theory incorporated the importance of both stressors and stress responses in explaining the linkage between stress and illness or disease. The transactional theory of stress suggests that stress responses can serve as new stressors that elicit more intense stress responses. For example, if an individual responds to interpersonal conflict (a stressor) by drinking alcohol and smoking cigarettes (an acute behavioral stress response), these behavioral responses may become new stressors that warrant additional stress responses.

Thus, transactional theory of stress incorporates components of stress stimuli and responses that operate upon one another in a cyclic fashion. In addition, interaction or transactional theories emphasize the relation between the individual and the environment, something rarely discussed by purely stimulus or response theorists.

[17] proposed a transactional theory of stress that has received considerable attention over the years. According to their perspective, it was not the initial stressor per se that was critical in linking stress to disease, but the individual's response to the stressor that determined whether a cyclic stress reaction developed.

Focusing upon the acute cognitive stress response system, [18] suggested that three types of cognitive appraisal occurred in determining the magnitude of the stress reaction: primary appraisal, secondary appraisal, and reappraisal. Primary appraisal focused upon the degree to which a person detected a stressor as being harmful (it leading to potential injury or illness), threatening (causing anxiety, fear, or damage to self-esteem), or challenging (leading to potential gain or growth). [18], noted that individuals determine whether a stimulus was irrelevant, benign-positive, or stressful; only stimuli appraised as stressful elicited ongoing stress responses. Primary appraisal was conceptualized as being accompanied by secondary appraisal, which focused upon a person's determination of his or her resources to cope with the stressor perceived during primary appraisal. The process of reappraisal involved any change in the primary appraisal as a result of the assessment of coping resources that occurred during secondary appraisal.

[19] as well viewed stress as a perceptual phenomenon, rooted in psychological processes. It has feedback components, making it a cyclical, rather than a linear process. He proposed a five-stage model: first, the individual is presented with a demand, external or internal (such as physiological or psychological needs). The second stage involves the person's perception of these demands, an assessment of his ability to manage the perceived demands given his perceived capacity to meet them. Stress is not an objective imbalance between demand and coping ability, but a subjective one. People make a cognitive appraisal of a potentially stressful situation. The third stage includes stress responses: psychological and physiological changes (sadness, aggressiveness, headache, etc.). In a fourth stage, cognitive defenses and behavioral responses are developed (rationalization, repression, nagging, etc.), and in the final stage a reappraisal of the situation occurs, forming a feed-back loop that transforms the process from a linear into a cyclical one. Therefore, ineffective or inappropriate coping strategies may prolong the experience of stress and thereby promote disease.

[20-22] in his experiments demonstrated that rats that were provided with both control and predictability over a stressful stimulus exhibited reliably little stress responses and less tissue damage than chained animals without control or predictability. According to [23], there are two distinct stress responses: the defense reaction and the defeat reaction. In a situation that provoked a threat to an organism, the fight-flight response was triggered, resulting in the defense/defeat reactions characterized by fleeing or displaying aggression.

Stress has been viewed in a systems manner, in which

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none of the variables alone is capable of explaining the emotional response and other associated problems. Stress is a handy term used to describe the operation of many processes that occur when demands/task exceed the person's resources. During this process, the person appraises the encounter by engaging in coping processes and responds cognitively and affectively to what is happening.

This theory opined that it is not the initial stressor that cause problem (marital stress), but how the individual responds which is capable of causing cyclic stress. Women are likely to experience marital stress because of their response to the initial stressor. For instance, a woman whose sex role such as caring for her family members cause her to record shortcomings at her office may react by nagging both at home and office which may trigger other stimulus such as spouse battering or query from work place which in turn increases marital stress. Thus, whether a woman will experience marital stress as opined above depends on coping strategies adopted and on the self-concept. If a woman adopts the best coping strategies in response to stress which is dependent on the interaction between the individual and the environment, marital stress will be at minimal and vice versa.

The theory equally posits that cognition is an important tool in the appraisal process. According to [24], cognition indeed refers to the mental process by which external or internal input is transformed, reduced, elaborated, stored, recovered, and used. Cognition is the activity of knowing: the acquisition, organization, and use of knowledge [25]. Applying the experience acquired through educational attainment to marital stress situation may determine the choice of coping strategies to adopt in the face of marital stress in a way to reduce its effect. This theory fails to realize that not every woman engages in cognitive appraisal of stressors. Again, the acquisition, organization and use of knowledge in Nigerian setting may not necessarily have to do with passing through formal education as a young married woman may be tutored on the rudiments of family life by an elderly woman usually the mother or the mother in-law. This is a common practice in the region and such mentoring may aid the married working woman with the techniques of dealing with marital stress. However, it is very pertinent to find out the role educational attainment of married working women plays in the management of marital stress.

2.1 Empirical Review

2.1.1 Coping Strategies and Marital Stress

In a study carried out by [26] on the relationship between coping strategies and distress, stress and marital adjustment of multiple-role women. The study examined time-management and self-care coping techniques that multiple-role women use and their relation to self-reported levels of distress, stress, and marital adjustment. The participants (N=69) were married, had at least 1 child under the age of 12, and were employed outside the home for more than 20 hours per week. It was found that number, type, and frequency of use of time-management and self-care coping strategies were significantly related to self-reported levels of distress, stress and particularly marital adjustment. Further analysis of high and low scorers on the marital-adjustment test revealed significant difference between the groups on measures of distress and coping. Participants in the high-marital adjustment group had significantly lower levels of distress, employed a greater number of coping strategies, and reported greater frequency of use of coping strategies than participants in the low-marital adjustment group. [27] examined the predictive influence of marital stress spillover on job performance among married civil servants in Oyo State. Using 344 participants the researchers found that the five variables of marital stress when combined strongly predicted job performance. Taken separately, four variables; time management, household chore distress, financial distress and relational distress contributed significantly to the prediction. [28] using 82 couple found evidence for stress spill over throughout four years of marriage. The experience of stress spillover seemed to have important influences on marital quality. Changes in wives' stress were associated with changes in perceptions of the relationship. As wives' external stress increased, they perceived more problems within the relationship (effective communication, showing affection). [29] in her study on marital conflict, coping strategies, age and psychopathology among battered women in three eastern Nigerian States. A total of four hundred and eight-nine participants comprising 234 battered women and 255 non-battered women took part in the study. The findings include: the use of problem-focused styles attenuate marital stress, and also battered women that adopt emotion-focused strategies presented more depressive symptoms than battered women that adopt problem-focused strategies in coping with their marital difficulties.

In contrast, [30] in a study involving 978 pulled from the population of both married and non-married students of Miami University opined that problem-focused style is used when marital stress is within one's control and emotion-focused when it is out of one's control. But one way or the other both attenuate marital associated issues. Thus, coping strategies vary over or between situations with differing stress demands. Also, [31] in their study of the relationship between fear and phobia and methods of coping

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with stressors, found that high levels of fear and phobia in both normal and clinical populations, are associated with increased use of avoidance coping (emotion-focused) strategies to deal with stress and decreased use of threat devaluation strategies. Similarly, [32] noted that although emotion-focused coping is good in management of marital stress but problem-focused is the best because it brings a lasting outcome.

Many studies reviewed on coping strategies and marital stress were foreign with few indigenous studies. Most of the studies used couples and students as their research participants on the role of social support exchanges in the prevention of marital distress. From the above background, there is no difference in the use of problem-focused or emotion-focused styles between married students and non-married students. Hence, the need to address married working women and their coping styles since none of the above reviewed studies addressed this group of workers.

2.1.2 Self-Concept and Marital Stress

In a study [33] of self-esteem as the mediator between marital satisfaction and depression using 100 couple from various communities (100 husbands and 100 wives) found that self-esteem significantly mediated the relationship of marital satisfaction and depression. If the amount of love a couple expects from their marital quality doesn't fulfill their need of love and acceptance; their level of confidence (self-concept) and their self-esteem would automatically decline. Also, [9] using one hundred and fifty (150) men and women to explore the relationship between the differentiation of self-concept and marital stress at various stages of marriage life, found that the level of marital stress depending on the duration of the marriage was negatively correlated for women and positively correlated for men. In a study conducted by [34] on the relationship between marital stress and self-esteem in the local context. A total of 924 disrupted spouses of Nigeria participated in the study. Among the findings include that marital stressed and separated people are more anxious, helpless and have lower self-esteem than married people. Studies have proved that those with high self-esteem focus on growth, whereas those with low self-esteem avoid mistakes in life. Marital stress and low self-esteem correlates [35]. Some researchers believe that having a high self-esteem facilitates goal achievement. [36] study found marital satisfaction to be positively correlated with self-esteem, so that higher self-esteem was associated with greater satisfaction.

Contrary [37] carried out a study on a model of subjective and objective self-disconfirmation, self-efficacy, depression and marital happiness. One hundred and fifty-five couples were interviewed and the result opined that having high self-concept depends on how well one's spouse thought of her while those with low self-concept prefer those spouses who thought poorly of them.

The studies reviewed were merely on self-esteem and marital stress because of limited studies on self-concept and marital stress and also all the studies except one were done in the western countries without any indigenous study on self-concept and marital stress. All the studies equally assert that low self-esteem leads to marital stress while high self-esteem increases coping. The above studies proved that married people have high self-esteem compared with non-married yet, none of the past studies reviewed in this study used married working women as research participants. Thus, the researcher explored the influence of self-concept on marital stress of married working women especially in Nigeria in order to address this gap.

2.1.3 Educational Qualification and Marital Stress

[38] examined the relationship between marital adjustment, stress and depression. The participants consisted of 150 working and non-working married women (working married women = 75, non -working married women = 75) who belong to middle and high socio-economic status. Using Beck Depression Inventory (96), Stress Scale (91) and Dyadic Adjustment Scale (00). Findings revealed a remarkable outcome among marital adjustment, depression and stress. The result equally proved that working married women meet more challenges in their marriage compared to their non-working counterpart. Women who acquired more education and those who are not working experience less depression in comparison to less educated and non-working women. The finding of [39] is that the educational attainment of partners is vital to their relationship with their spouse, particularly during the initial years of marriage. Female education enhances their relationship with their partners unlike male education.

Similarly, the [40] found that married people with lower education experience marital termination more. [35] in his study on the relationship between marital stress and educational level in the local context. A total of 924 disrupted spouses of Nigeria participated in the study. Among the findings include that marital stressed and separated people are more anxious, helpless and have lower self-esteem than married people; the results of the study suggests that the stress of graduate spouses was significantly higher than that of respondents from secondary level and illiterate spouses. Also stress of graduate respondents is significantly higher than that of secondary level and literate respondents is also found to be significantly high than that of illiterate

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respondents. The above findings indicate a remarkable outcome between stress and educational attainment of the participants. [41] conducted a research involving the three main tribes in Nigeria. The participants for the study were a sample of 865 selected across the three main ethnic tribes in Nigeria. However, it was reported that level of education differs significantly with adjustment strategies on the bases of ethnic group. Contrary [42] conducted a research on level of education and marital distress in Ghanaian married couple (a comparative study comparing two levels of education in status; high and low were used to analyze the data. A sample of married couple who had been married two years or more with a minimum of secondary school education were used. In all, 80 married men and women with equal sampling number of 40 men (husband aged 28-64yrs) and 40 women (wives aged between 25-56 years) who reported martial distress on the measuring instrument were selected. Findings, partners with low education and those with high education did not differ in their experience of marital distress.

Thus, those with high education were not less distressed than those with low education. Similarly, [43] observed a little positive relationship between years spent in studying and marital satisfaction whereas in women there is no idea of a relationship. [44] discovered that males and females with high education have high percentage of separation/divorce. For the women, those that are highly educated are anticipated to have good career and also less economically dependent on their spouses. [45] research on how husbands and wives who live separately for reasons relating to work location and others, opined that years of study has no relationship with married people adjustment while staying apart with their partners. However, some inconsistencies were observed whereby some studies have shown contradicting differences in the relation of educational level and marital stress. Most of the studies were foreign with only three done in the Nigeria, two found positive relationship while one study recorded no significant difference on marital stress and educational level. Thus, only one study conducted research using married working women while others were conducted on couples.

2.2 Hypotheses

The following hypotheses were tested:

(1) Married working women who used emotion-focused coping will experience less marital stress.

(2) Married working women who had high self-concept will experience less marital stress.

(3) Married working women who had higher educational qualification will experience less marital stress.

(4) Coping strategies and self-concept will jointly have an impact on marital stress.

(5) Coping strategies and educational qualification will jointly have an impact on marital stress.

(6) Self-concept and educational qualification will jointly have an impact on marital stress.

(7) Coping strategies, self-concept and educational qualification will have interaction influence on marital stress.

3. Method

3.1 Participants

The participants comprising 377 married working women sampled from non-tutorial staff of two Nigerian Universities partake in the research. Employing criterion sampling technique, one hundred and fifty-nine staff were chosen from University of Nigeria Enugu Campus while the remaining two hundred and eighteen staff were sampled from Enugu State University of Science and Technology (ESUT) Agbani. Out of this number, 206 participants possessed lower educational qualifications, while the remaining 171 possessed higher educational certificates. Number of children as provided by the participants were as follow: 25 women had 1 child each; 64 women had 2 children; 76 had 3 children; 110 had 4 four children; 46 had 5 children; 40 had 6 children; 10 had 7 children while the remaining 6 had 8 children each. It was also observed that 108 women were in their early marriage (1 year to 9 years) and the other 269 women were in their late marriage (10 years and above). Eighteen out of the participants reside in the school compound while 359 women were staying off campus. Some benchmarks observed in sampling the staff are hereby listed: living together with husband at the time of the research; not less than a year in marriage in addition to completion of secondary school. This was to ensure that the participants were those exposed to marital and parenting pressures and also to enable them to read, understand and fill the questionnaires properly. The ages of the participants were 25 - 55 years (mean 40.63 and standard deviation 7.59).

3.2 Instrument

Three instruments were adopted in the research: [46] 32-item Coping styles, [47] 50-item Marital Stress Inventory (MSI) and [48] Semantic Differential Self-concept Scale.

3.2.1 Marital Stress Inventory [47]

[47] MSI contains 50 items that hold factors likely to arouse marriage related problems between husband and wife. These worries may include: insufficient fund, lack of com-

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munication, etc. All the items were measured on a 5-point Likert scale: minor outcome (1) to serious outcome (5).

Scoring: It has a direct scoring format; hence the scores of staff are obtained when the values of the items are added together. Normative sample: M(n=275) = 77.83; F(n=282) = 74.49; M&F(n=557) = 76.20. The scale is both valid and reliable as provided by the original author, meanwhile a pre-test done by the researcher further proved that the test is reliable and valid. Hence, the Alpha coefficient of 0.72 (0.84) and validity index of 0.78 acquired through (MSI) [46] with Marital Conflict Behaviour Checklist (MCBC) [49] designed to assess the presence of conflict based on its frequency in marital relationships.

3.2.2 The Health and Daily Living Form [8]

The scale was used in this study to group the participants into the two categories of coping styles stated earlier. It is a 32-item scale with 4-point Likert response which include: 1 (seldom) to 4 (all the time). Scoring: The 20-items that measure problem-focused were scored directly while the remaining 12 items measuring emotion-focused were scored in reverse order. Scores above 68 indicate problem-focused style whereas scores below 68 indicate emotion-focused styles. Revalidation of the scale by the researcher yielded a reliability coefficient of 0.80 and validity index of 0.89 which compares favourably with the original indices of the instrument as being reliable and valid for the study.

3.2.3 The Semantic Differential Self-Concept Scale [48]

It is a 54-item Semantic Differential Self-Concept Scale [48], used to determine the self-concept of the participants. It is a measure on a 7-point Likert scale from bad (1) to good (7). The response format of the scales ranged from 1 (bad) to 7 (good). Semantic Differential Self Concept Scale by [48] was used to measure the self-concept of married working women. This is to predict those that have low or high self-concept.

Psychometric Properties [48]

3.2.4 Reliability

[48] Reported an alpha coefficient of r=.70, p<.001. It was determined by the correlation of the test-retest scores.

3.2.5 Validity

According to [48] Standard Deviation scores from 78 participants were subjected to internal factor analysis [50], to determine the relative contribution of each item to the test correctness. Result obtained in the factor study showed that the commonalities (H squared) for the 54 items ranged from 59-85. A total of 16 factors emerged but one general factor; the self-concept factor included all the items, each with a positive factor loading, ranging from .20 to .64. The researcher found coefficient of 0.95/0.97 correctness index of 0.98. According to [51]. Thus, r of 0.97 = validity index of 0.98.

3.2.6 Procedure

Author of this work through a letter of introduction that was obtained from the Head Department of Psychology ESUT received authorization from the Vice Chancellor of ESUT and Deputy Vice Chancellor of UNEC to embark on the study with their staff. The writer of this work was assisted by many research assistants who were trained on tests administration and collation. Four hundred and ninety (490) tests measuring demographic variables and the study constructs were distributed to the staff who gave their consent to the study in their various offices. Four hundred and seventy-one (96.12%) were collected, ninety-four (94) questionnaires were rejected for lack of merit, hence, three hundred and seventy-seven (377) tests correctly responded to by the staff were analyzed.

3.2.7 Design and Statistics

Cross-sectional survey analysis was adopted as the research design. Based on the three independent variables in this study (coping styles, self-concept and educational qualification) and one dependent variable (marital stress) a three-way ANOVA was used to ascertain if there is independent or joint impact of the independent variables on the dependent variable. The study adopted 3-way analysis of variance Fisher's test with unequal sample sizes based on three independent variables; 2 (coping strategies: problem-focused strategies vs. emotion- focused strategies) x 2 (self-concept: low self-concept vs. high self-concept) x 2(educational level: lower educational level vs. higher educational level) and a dependent variable (marital stress).

4. Results

Table 1 showed that staff who used emotion-focused styles had less means (134.70) compared with those who used problem-focused styles (153.01). It means that those who applied emotion-focused styles had less manifestation of marriage related symptoms. The table also shows that working women who had high self-concept (151.47) had higher mean score than those who had low self-concept (135.24) on marital stress. This implies that married working women who had high self-concept did not differ in their presentation of marital stress symptoms from

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Table 1. Summary of descriptive analysis on Marital Stress and Nigerian Married Working Women: The Role of Coping Strategies, Self-concept and Educational Qualification

Coping Strategies	Self-concept	Educational Qualification	Mean	Std. Deviation	N
Problem-focused Coping	Low Self-concept	Lower educational qualification	163.63	69.24	35
		Higher educational qualification	153.56	71.18	29
		Total	159.06	69.75	64
	High Self-concept	Lower educational qualification	164.56	71.18	63
		Higher educational qualification	130.27	71.69	49
		Total	149.55	73.40	112
	Total	Lower educational qualification	164.22	70.49	98
		Higher educational qualification	138.92	71.93	78
		Total	153.01	72.04	176
Emotion-Focused Coping	Low Self-concept	Lower educational qualification	121.84	71.43	62
		Higher educational qualification	124.55	65.44	65
		Total	123.23	68.17	127
	High Self-concept	Lower educational qualification	168.35	79.56	46
		Higher educational qualification	131.43	79.79	28
		Total	154.38	81.12	74
	Total	Lower educational qualification	141.65	78.13	108
		Higher educational qualification	126.62	69.69	93
		Total	134.70	74.54	201
Total	Low Self-concept	Lower educational qualification	136.92	73.13	97
		Higher educational qualification	133.50	68.22	94
		Total	135.24	70.59	191
	High Self-concept	Lower educational qualification	166.16	74.80	109
		Higher educational qualification	130.69	74.22	77
		Total	151.47	76.39	186
	Total	Lower educational qualification	152.39	75.27	206
		Higher educational qualification	132.23	70.78	171
		Total	143.25	73.86	377

Table 2. Summary Table of Marital Stress and Nigerian Married Working Women: The Role of Coping Strategies, Self-concept and Educational Qualification

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	138503.87[a]	7	19786.27	3.82	.001
Intercept	7123423.76	1	7123423.76	1374.37	.000
Coping Strategies	23015.52	1	23015.52	4.44	.036
Self-concept	5111.53	1	5111.53	.986	.321
Educational Qualification	32784.69	1	32784.69	6.33	.012
Coping Strategies * Self-concept	30467.18	1	30467.18	5.88	.016
Coping Strategies * Educational Qualification	548.51	1	548.51	.106	.745
Self-concept * Educational Qualification	21648.90	1	21648.90	4.177	.042
Coping Strategies * Self-Concept * Educational Qualification	1262.90	1	1262.90	.244	.622
Error	1912546.19	369	5183.05		
Total	9786944.000	377			
Corrected Total	2051050.06	376			

Note:
a. R Squared = .068 (Adjusted R Squared =. 050)

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those who had low self-concept. In the same vein, married working women who had lower educational qualification (152.39) had higher mean score than those who had higher educational qualification (132.23).

This indicates also that married working women with lower educational qualification presented more marital stress symptoms than women with higher educational qualification. The dependent measures were the participant's scores on marital stress inventory.

Table 2 proved that a remarkable difference exists between staff who used emotion-focused styles and those who used problem-focused styles F (1, 369) = 4.44, sig. = .036. Thus, it confirmed the first hypothesis that married working women coping strategies will have an impact on their marital stress. The table also shows that self-concept was not significant, F (1, 369) = 0.99, sig. = .321. This also disconfirmed the second hypothesis that married working women self-concept will have an impact on their marital stress.

Further, the Table shows that the factor of educational qualification yielded a remarkable outcome F (1,369) = 6.33, sig. = .012, hence the hypothesis that married working women educational qualification will have an impact on their marital stress, was accepted. The result indicates that there exist educational qualification differences in marital stress.

The table equally shows significant interaction influence of coping strategies and self-concept, F (1, 369) = 5.88, sig. = .016. This is graphically represented in Figure 1.

Finally, the Table shows significant interaction influence of self-concept and educational qualification, F (1, 369) = 4.18, sig. = .042. This is also graphically represented in Figure 2.

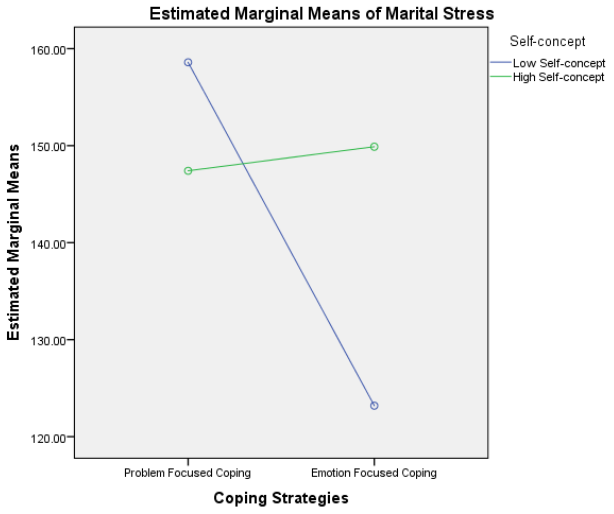

Figure 1. Graph showing the interaction of coping strategies and self-concept on marital stress of married working women

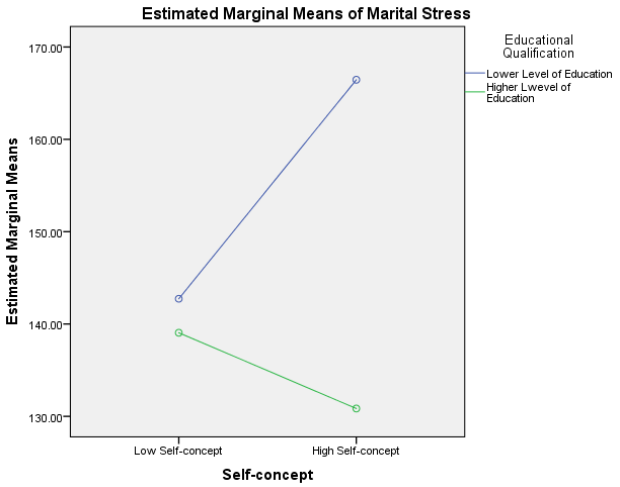

Figure 2. Graph showing the interaction of self-concept and educational qualification on marital stress among married working women

5. Discussion

Result of this study indicated a statistically significant influence of coping strategies on marital stress. This means that there was a remarkable difference between the marriage related problems of those who used emotion-focused styles and those who used problem-focused styles. Thus, observation of the mean scores in Table 1 shows that women who adopted emotion-focused styles manifested less marital stress symptoms than those who used problem-focused styles. Hence, hypothesis 1 was confirmed. The result is in line with the work done by the following authors [26-29] who opined that problem-focused styles is used when marital stress is within one's control and emotion-focused when it is out of one's control. But one way or the other both attenuate marital associated issues. In contradiction, the result of the study is not in agreement with the following works [29,32] who opined that emotion-focused styles attenuate marital stress temporarily whereas problem-focused styles give a long-lasting relief. The finding of this work seems to depend the population studied, in "Igbo land" Nigeria most women engage in various church/social activities coupled with the fact that the staff deal with students and co-staff almost all the time, which suggest that they have enough distractions capable of attenuating marital stress. Often, they share their marital challenges and understand that nobody is free from marriage related stress hence, the use of denial or distortion of the reality as an immediate relief from stress. Emotion-focused styles should be adopted in the face of adversity, hence [16] opined that how to make head way during stressful period depends on inherited factors and its

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interaction with ones' environment.

Second hypothesis which stated that married working women with high self-concept would differ in manifestation of marital stress symptoms from those with low self-concept was confirmed. The result showed non remarkable outcome on the participants' marital stress. The finding is in contrast to the study carried out by [38] who opined that having high self-concept depends on how well one's spouse thought of her while those with low self-concept prefer those spouses who thought poorly of them. Nigeria women especially the "Igbos" do not really have a self-concept that is not linked to the family or the marriage, so the self-concept of women does not really matter. This may be the reason why the participants' self-concept has nothing to do with their marital stress.

The third hypothesis which stated that married working women who had higher educational qualification will experience less marital stress was accepted. The finding is in contrast with previous research on educational level and marital challenges [35,42,45] they opined that women with lower level of education experienced less marital stress compared to those with higher educational qualification. The studies conducted [44,43] reported no correlation between educational level and marital stress. However, in support of the above findings [40,41] and [39] reported thus, staff who experience marital stress are participants with lower educational qualifications. The studies also discovered that women with higher educational qualifications relate well with their husbands. This is on the basis that people gain knowledge through education, knowledge on how to handle issues in the family and how to relate with spouse. Women who scored high on the factor of educational level showed less marital stress symptoms, while those who have acquired low education showed high marital stress symptoms. In other words, in the course of acquiring high education one might also learn how to address some important life issues like insufficient funds, persistent nagging and fight, etc. The author opined that higher educational qualifications should be encouraged among married female workers to forestall or reduce marital stress.

The significant interaction influence of coping strategies and self-concept seems to suggest that the intensity of marital stress depended on type of coping strategies and self-concept in place. Thus, the result shows that coping strategies and self-concept jointly contribute to the manifestations of marriage related issues by staff who took part in this study. This finding suggests that coping strategies and self-concept influence the manifestations of marital difficulty. The interaction of problem-focused styles and high self-concept is key reducing one's marital challenges.

To be stable in the face of marital stress, one should adopt problem-focused coping and have high self-concept. The result also suggests that to deal with marital stress working women should adopt emotion-focused coping and show low self-concept, since those who adopt emotion-focused coping and high self-concept suffer more marital stress.

Finally, the significant interaction influence of self-concept and educational qualification seems to suggest that the intensity of marital stress depends on one's self -concept in conjunction with educational qualification. Hence, the result shows that self-concept and educational qualification jointly contribute to the manifestation of marriage related problems of the participants. The interaction of factors of self- concept and educational qualification in marital stress showed that to remain stable, one needs to develop high self-concept and acquire high education and or low self-concept and high education.

5.1 Implications of the Findings

The findings from this study have opened a new area for health management in Nigeria. It is the intention of the Nigerian government to ensure that good health is provided to the general populace thus the popular saying that a healthy nation is a wealthy nation and also that good health is good wealth. The Nigerian government in their various policies has tried in the provision of basic health care aids such as drugs, the training and re-training of health personnel, etc, yet more are needed in the area of mental health care especially among married working women.

The outcome of the study has added to the existing knowledge in this area, so people should adopt coping styles in managing their marital issues especially the use of emotion-focused style. Finally, twenty-first century women unlike their predecessors have a lot to tackle like being efficient in their work places and at the same time performing their sex roles. Thus, there is every need for them to equip themselves with higher education plus the use of emotion-focused styles in handling marital issues.

5.2 Limitations of the Study

Main demerit to this research was the women inclination towards self-report tests as delving into their private lives. Some staff were not keen to answering the research instruments owing to their extensive nature. The author did not gather other important variables of the staff such as the participants spouses' career, educational level, social standing and other forms of house help accessible for the women. Lack of adequate finance limited the study to

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only two Universities which may affect the generalization of the findings of this research.

5.3 Suggestions for Further Studies

Further studies are vital because the present research captured only the women who are relatively literate and seemingly economically stable. Many variables which may help women in managing their marital issues should be studied such as participants spouses' work career, their educational attainment, the effect of child bearing and rearing in the management of marital discords, etc. Married working women in other cultures and other universities should be studied to aid external validity of this findings. Further research should do a comparative study between educated and non-educated women, employed and unemployed women in the bid to aid the generation of the findings.

5.4 Summary and Conclusion

The study investigated marital stress and Nigerian married working women: the role of coping strategies, self-concept and educational qualification. The result of the study indicates significant influence of coping strategies on marital stress, women who adopted emotion-focused coping showed less manifestations of marital stress than those who adopted problem-focused coping. Married female staff who have higher educational attainment were more stable in the face of marital discord compared with those who have lower educational attainment. It was equally found that problem-focused coping interacted with high self-concept in alleviating marital stress. High self-concept and higher educational qualification jointly attenuate marital stress among married working women. Basically, it is recommended that using an emotion-focused style will ensure that married working women remain stable during the experience of marital stress. Education on the other hand plays a vital role in attenuating marital stress, thus it is highly recommended that the government pay attention to ensuring that women in Nigeria have access to quality education in the bid to support their future career, prior to marriage and even during marriage, etc. The importance of how society portrays women in general affect their self-concept, thus it is the responsibility of the whole community in Nigeria to highlight equality among gender especially in "Igbo land". This is paramount especially as self-concept has no impact on marital stress of married working women which may depend on the assumption that in Nigeria, women do not really have a self-concept that is not linked to the family or the marriage, so the self-concept of women does not really matter. The spouses of the married working women have a role to play in order to enhance their self-concept since high self-concept has a link with problem-focused coping and also higher education to lessen marital stress of their spouses.

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