COVID-19 and Actor Well-being: A Serial Mediated Moderation of Mask Usage and Personal Health Engagement

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Wearing of face mask has become the new norm and a requirement for accessing public spaces. The current study explored the drives of self-regulation towards the purchase and use of face masks for actor wellbeing and public safety. The study adopted a cross-sectional survey approach. Data from 1859 participants sampled specifically from lockdown areas are the backbone of this study. We drew inspiration from the self-regulation theory and the trending slogan "any mask is better than no mask" to propose a model based on the fear of COVID-19 and actor wellbeing. We adopted Hayes' PROCESS macro in analyzing the proposed model. The findings confirmed that the fear of COVID-19 (β=.78, p<.001) invokes actors' self-regulation and alters attitudes (β=.521

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p<.001) to drives mask purchase intentions and use significantly. We also re-echoed the role of self-efficacy in the behavioral change decision-making under threatening conditions. The models explained a total variance of 80% in explaining how the fear of COVID-1D invokes an individual's behavioral change towards public safety and actor wellbeing. Policymakers, wellbeing psychologists, and healthcare practitioners can leverage the finding in this work to understand the antecedents that promote people's behavioral change towards psychological and physical wellbeing, such as that which come with COVID-19 and mask use. In particular, face mask advocates can leverage this paper's fear and wellbeing understanding in their promotional and educational exercises. We recommend reconsidering mask use protocols to support the slogan "Any Mask is Better Than No Mask."

1. INTRODUCTION

The world has practically come to a standstill in recent times because of COVID-19 and the strategies to fight it. Individuals, scientists, nations, and governments have channelled resources into saving lives and the economy from the grips of the 2019-novel SARS-2 virus known as the COVID-19. The outbreak of COVID-19 has affected the wellbeing and health of individuals and societies all over the world. This has imposed physical, cognitive, psychological, and social challenges with pressure on the service industry as much as on other sectors. When engaging with service providers, customers are crowned with fear for their health [1]. Logistics service quality and other sectors such as education, transportation, tourism, and hospitality were greatly affected while new markets, including online shopping, door-to-door services delivery, and live streaming businesses, spike to record heights [2]. Many of these are due to the fear of COVID-19, change in consumer behavior and lifestyle, and individuals' self-efficacy to succeed in handling and adapting to new and complex behavioral risky situations, and the self-regulation in the avoidance of disease has become vital to survival [3]. People will voluntarily or otherwise develop a behavioral immune system that drives change in response to survival [4]. This behavior change is crucial to managers, service providers, and public institutions responsible for controlling and managing infectious diseases.

Research has established that humans are rooted in self-organizing structures that, during a critical event like a pandemic, are triggered to adjust, endure, and develop to manage the circumstances. With Covid-19, social and physical distancing and mask use have been one of such structures triggered towards surviving and consumer safety, which require agility and efficiency [5]. Several papers in the service industry have drawn the need for consumer and actor safety first from the hierarchy of needs theory [6, 7]. This study examined how fear of COVID-19 alters the behavior, attitude, and intention in using and purchasing face masks towards consumer wellbeing.

This research will be among the first to bridge the existing theoretical, conceptual, and practical gap by examining influential factors of individuals' behavioral intention (fear of COVID-19) and the practicalities of behavior change (mask use) in examining the intentions of face mask purchase towards the actor and public safety and wellbeing. The researchers anticipate that this study's results will correspondingly provide a practical analysis for governments, and policymakers, to understand individuals' behavioral intentions to the use of face masks before any investment in face masks or applying face masks policies and measures, especially now that many countries are experiencing a second wave of COVID-19.

1.1 Self-Regulation

Self-regulation has multiple dimensions (conscious or automated process) with several definitions [8,9,10,11]. Self-regulation in this study is, however, operationalized according to the definition by [11], stating that self-regulation is a conscious process in which the individual dedicates the needed effort to override a natural response or behavior and substitute it with a more effortful behavior or response that is more consistent with a targeted goal(s). Refraining from unsafe sex and over-eating, resisting urges to drinking and smoke might all be considered examples of self-regulation. From this definition, self-regulation may be simplified as the ability to change oneself and control an inner process for a better result. Self-regulation is, therefore, a key indicator to success when viewed from a cultural,

interpersonal, or biological perspective. The Economic and social detriments of self-regulation failure are numerous, including unsafe sex, drug abuse, AIDS and other transmittable diseases, obesity, unethical business practices, gang, and violence. Following these downsides of self-regulatory failure, people's consciousness and subconsciousness are always on the lookout for signals that may cost lives, social and economic damages, and ready to avert them [12]. The relationship between fear and self-regulation is consistent in the literature [13,14]. The fear of infectious disease can lead to several problems beyond the mere presence of fear itself. Literature relating to the Zika virus argues that fear causes individuals to more easily condition themselves for self-regulation and a self-reinforcing cycle of avoidance [15]. several other studies also found links between fear. They committed compliance and that actors will comply with specific directives and personal goals because of fear (ref). in effect, the fear of COVID-19 will cause actors and consumers to adhere to specific guidelines such as wear of face mask to override the consequences of contracting COVID-19.

1.2 Fear, Attitudinal Change, Intention, and Well-Being

Emotion (in our case, fear of COVID-19) is the underlying precursor of regulation: in the absence of the occurrence of emotion, there is nothing to regulate [16]. Studies on the drive model have established that fear creates and drives tension. This tension increases acceptance and attitudinal change. Similarly, an initial increasing level of fear is argued to correlate with an increasing message acceptance [17, 18]. The literature argues that fear motivates behavior change, including adaptive control actions (attitudinal change and message acceptance) and maladaptive control actions (behavioral change including avoidance and reactance) [19]. Maladaptive control actions are enshrined in the theory of self-regulation to avoid disease contraction [3].

The causative effect of fear on attitudinal change is not new in the literature. Fear proves to have a positive correlation with attitude documented in both experimental and non-experimental studies, such that the sturdier the fear, the more persuasive it is, resulting in a change in attitude [20,19]. Although existing studies have measured attitude in a wide range of ways, all point to some

correlation based on fear, fear appeal, and fear manipulation. In the context of consumer safety and wellbeing, fear constitutes the motivation that triggers human's cognitive, psychological, physical, and social-behavioural change towards survival [21,22,23]. As argued in the literature, avoidance is among the most effective ways of self-regulation due to fear because prevention is much easier than stopping an event once it is underway [24]. At the centre of COVID-19 prevention is a face mask.

We proposed the following hypothesis to understand the wellbeing purchase relationship between fear of COVID-10 and face mask purchase intention.

H1: Fear of COVID-19 has a positive relationship with face mask use attitude

H2: Fear of COVID-19 has a positive association with the purchase intention of any face mask

H3: Fear of COVID-19 has a positive relationship with the intention to use any face mask

H4: Face mask use attitude partially mediates the relationship between the fear of COVID-19 and mask purchase intention.

H5: Face mask use intention partially mediates the relationship between the fear of COVID-19 and mask purchase intention.

H6: Face mask use attitude has a positive association with mask use intention

H7: Face mask use attitude partially mediates the relationship between fear of COVID-19 and mask use intention.

H8: Face mask use attitude has a positive association with mask purchase intention

H9: Face mask use intention has a positive association with mask purchase intention

H10: Face mask use intention partially mediates the relationship between mask use attitude and mask purchase intention.

H11: Self-efficacy in face mask use positively moderates the association between fear of COVID-19 and Mask purchase intention.

H12: Self-efficacy in face mask use positively moderates the association between fear of COVID-19 and mask use attitude.

H13: self-efficacy in face mask use positively moderates the association between fear of COVID-19 and mask use intention.

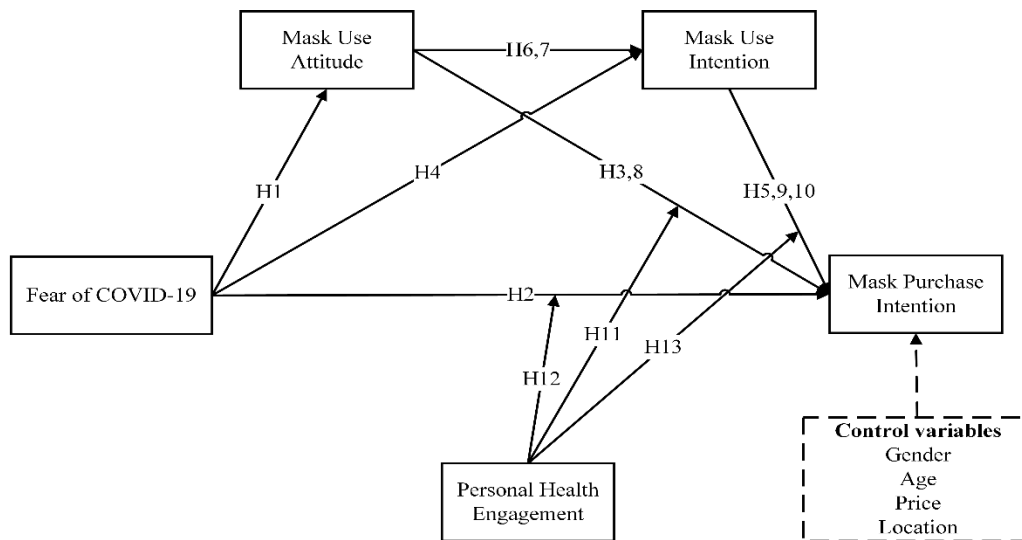The hypotheses are summarized in Fig. 1.

Fig. 1. Summary of Hypotheses

2. METHODS

A cross-sectional survey approach was used to recruit a total of 1937 participants through an online public survey using a link generated from google forms and distributed through social media and email contacts. Location-filter questions, including region, district, and city/town, were asked at the end of the survey to ensure only respondents in the target study areas were included. To ensure the quality of responses, participants were asked if they do not understand or feel any of the items were ambiguous. Two "yes" respondents were excluded. Next, since respondents were from varied backgrounds, we checked their English proficiency with a self-reported scale, and all respondents with scores below average were excluded in the final data set to endure the items were well comprehended. We also observed all response patterns and eliminated respondents, with over 90% repeated responses (e.g., strongly agree or uncertain throughout). Data analysis, thus, was based on 1859 samples.

2.1 Measures

To measure the variables used in this work, we adopted and modified existing measurements in some instances. The seven-item *fear of COVID-19 scale* [25] was used to measure the fear of COVID-19 (Cronbach's α =.77). Purchase intention was measured using the five-item intention to buy scale by Dodd, Monroe, and Grewal [26] (Cronbach's α =.92). The 6-item face mask use scale (FMUS) [27] was modified and used to measure mask use attitude (Cronbach's α =.85). The general self-efficacy scale [28] was modified to reflect an individual's self-efficacy to withstand the effects of COVID-19 (Cronbach's α =.87). We adopted and modified Bryan, Rocheleau, Robbins, and Hutchison's [29] safer sex intention scale and the behavioral intentions towards future condom use [30] to measure mask use intention (Cronbach's α =.90). Respondents' consents were obtained with the inclusion of two related questions in the questionnaire and were guaranteed confidentiality and the anonymity of the data. Participants were free to terminate and exit the survey at any point.

3. RESULTS

The analysis is based on a serially moderated mediated regression analysis supported by the Hayes' process macro extension of SPSS v26 [31]. Key variables that are known to affect consumer decision-making (price, age, and location) were controlled.

Table 1 shows the study variables' reliability statistics, including the CFI and RMSEA, indicating the latent variables measured what they intend to measure. The correlation analysis (Table 2) shows that the independent and mediating variables have statistically significant and positive relationships with mask purchase intention.

Table 1. Reliability and validity of measures

Variables	No. of Items	Items retained	α	GFI	CFI	NFI	RMSEA	Factor Loadings
Mask Purchase intention	5	5	.92	.92	.92	.96	.05	.53 — .84
Fear of COVID-19	7	4	.77	.98	.97	.99	.04	.51 — .75
Mask use attitude	6	5	.90	.91	.93	.97	.05	.55 —.75
Mask use intention	6	4	.85	.95	.92	.96	.06	.50 —.78

Table 2. Bivariate correlation analysis

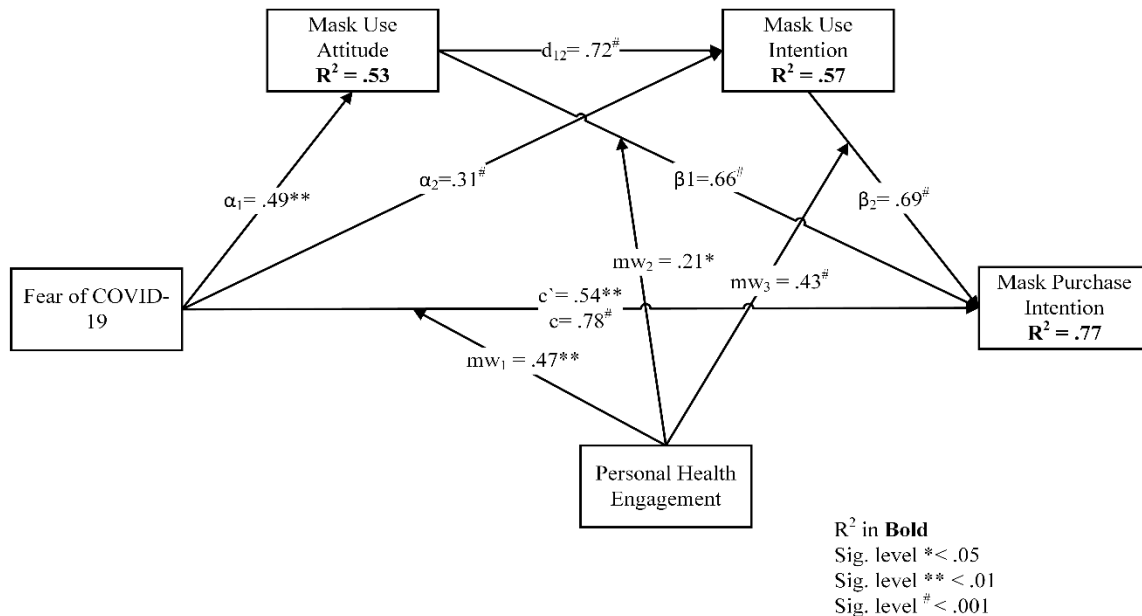| Variable	1	2	3	4	5
Mask purchase intention	1				
Fear of COVID-19	.378#	1			
Mask usage attitude	.129*	.403#	1		
Mask usage intention	.269#	.299#	.521#	1	
Self-efficacy	.027**	.069*	.373#	.415#	1
SD	1.053	1.206	.690	.735	.854
Mean	2.884	3.045	1.535	1.533	2.076

*Significance level *p<.05, **p<.01, #p<.001*

Fig. 2. Hypotheses testing for direct effects

In Fig 2, mask use intention and mask use attitude (β=.521 p<.001). Self-efficacy with mask use intention (β=.415, p<.001) and mask use attitude (β=.373, p<.001). The fear of COVID-19 and masks purchase intention (β=.78, p<.001) indicates that, as an individual's fear of COVID increases, the intention to buy any mask to stay safe increases supporting H2.

Similarly, mask use attitude (β=.69, p<.001) and mask use intention (β=.68, p<.001) both have their respective positive effects on mask

purchase intention. This provides support for H3 and H5. There is also a direct and positive association between mask use intention and mask use attitude (β=.68, p<.01), supporting H6.

Fig. 2 illustrates the direct effects, as stated in H1 to H6, which are all supported. After controlling for price, age, and location, the model produced a total variance of 80% (c` = .54; p<.01). From the mediation analysis (Table 3), the positive effect (β=.74, p<.01) on mask purchase intention supported H7, (β=.31, p<.05), and (β=.38, p<.01) for H8, H9, and H10.

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Table 3. Serial Mediation effect of mask use attitude and intention on fear of COVID-19 and mask purchase intention

	Path	B	SE	95% CI		Remarks
				LL	UL	
H7	Fear of COVID —> Mask use attitude —> Mask use intention	.46*	.08	.0742	.2486	Supported
H8	Fear of COVID—> Mask use attitude—>mask purchase intention	.74**	0.10	.6341	.8380	Supported
H9	Fear of COVID—> Mask use intention—>mask purchase intention	.31*	.06	.1314	.4905	Supported
H10	Mask use attitude —> Mask use intention—>mask purchase intention	.38*	.06	.2257	.5447	Supported

Table 4. Moderator effect on mask purchase intention

Hypotheses	Path	95% CI				
		B	SE	LLCI	ULCI	Remarks
H11	Mask usage intention*self-efficacy—>mask purchase intention	.39#	.1386	.1647	.6228	Supported
H12	Fear of COVID-19*self-efficacy—>mask purchase intention	.071**	.053	.0282	.1802	Supported
H13	Mask usage attitude*self-efficacy—>mask purchase intention	.12**	.0461	.0256	.2071	Supported

*$p<.05$, **$p<.01$, #$p<.001$*

There is a moderation effect (Table 4) of self-efficacy (β=.071, SE .053, $p<.05$) on the relationship between fear of COVID-19 and mask purchase intention. The interaction terms predicted mask purchase intention (β = .12, SE =.0461 $p < .05$ and β= .39, SE= .1386, $p < .001$) supporting H11, H12, and H13.

4. DISCUSSION

First, we established that face masks' purchase intention is positively associated with the fear of COVID-19. Fear is a known influencer in determining behavioral change, especially regarding public health and wellbeing [32]. COVID-19 has caused economic, social, and health-related fears the world has never seen before. From the works of Ahorsu et al. [25], fear of COVID-19 has uttered human activities globally, and individuals are becoming more conscious of safety precautions and general wellbeing. Our result echoed this view and supported previous studies that linked fear to attitudinal change [32,20,33,19]. With the recommendation of face masks as one of the cheapest and easiest means to prevent COVID-19, the related fear has a higher tendency to trigger people's inherent self-regulation towards the use of face masks, more so, any face mask amidst a global shortage of medical face mask.

Fear is said to have a reasonably good and reliable effect on attitudes, intentions, and behaviors. Fear, if leveraged under the right circumstance, will motivate behavior change. In this work, we re-echoed the association between fear and purchase intention of the corresponding averting kit (face mask). The literature argues that the perceived loss of life and physical and psychological wellbeing will lead people to act to avert any possible outcome [34,35]. We argued that the higher the fear of COVID-19, the more significant the quest to stay alive, thus, will increase the purchase intention of masks.

Self-efficacy has been at the center of fear-behavior research. Self-efficacy is considered to affirm one's ability to combat the risk of threat and increases the likelihood of performing a recommended danger-control behavior [36]. In this study, we tested the moderating effects of self-efficacy on purchase intention amidst fear of COVID-19. Whiles self-efficacy and intention are not new in e-commerce [37,38,39,40], its relationship with mask buying and fear of COVID-19 for public safety and actor wellbeing is new. Like in previous studies, self-efficacy has a positive interactive effect in explaining the purchase of PPEs and disease prevention kits [41].

Even though product price is a known influencer in consumer decision-making, it is not a concern in life-saving decision-making. Gender and location were equally not statistically significant in our model. This supports the findings of an earlier study on the purchase of PPEs in the wake of COVID-19, which suggests that, under life-threatening conditions, cost and location are less significant [32].

Attitude and intention are the central ideas of behavioral change and health-risk prevention and management. They are also known to be among the critical purchase intention predictors [42]. Several studies argued and presented new trends in the wake of COVID-19 and actor/consumer behavioral change. However, it is novel to combine a newly developed scale (fear of COVID-19) in predicting the wellbeing purchase intention of face masks in a self-regulatory context. The variables used here are not new; however, their application in the contexts of personal and public safety has not yet been explored by any existing study. This study, thus, provides a foundation for applying self-regulation theory in the area of purchase behavioral change and particularly towards actor/consumer wellbeing under pandemics like COVID-19. It is important to note that this article links attitude and purchase intention to actor wellbeing during disasters, such as the COVID-19 pandemic. It provides a novel perspective, conceptualization, and connectivity between fear, attitude, and well-being-related buying [32]. Scholars should pay attention to these variables' interaction and interconnectedness in explaining actor/consumer wellbeing during disastrous situations. For example, the fear that comes with a pandemic determines people's readiness for attitudinal change to avert fetal outcomes. In times of disaster like the COVID-19, researchers should investigate how to achieve actor wellbeing from different perspectives [43,44].

Wearing face masks is not known to cause any detrimental physiological changes, and the possible life-saving benefits of wearing face masks outweigh any documented discomforts [45]. Therefore, policymakers, wellbeing psychologists, and healthcare practitioners must understand the antecedents that promote people's behavioral change towards psychological and physical wellbeing, such as that which comes with COVID-19. In particular, face mask advocates can leverage the fear-wellbeing understanding in this paper in their promotional and educational exercises.

Policymakers knowing consumers' willingness to use any mask that will offer protection, can advocate using any mask and accompany such campaigns with the recommended safety guidelines to ensure people use the mask of their choice well since any mask is better than no mask.

5. CONCLUSION

The current study highlighted the association between fear of COVID-19 and actor wellbeing purchase behavioral intention guided by the self-regulation theory. While this work might not be the first of its kind, it is definitely among the few studies that adapted the fear of the COVID-19 scale specifically to study mask purchase intention towards actor/consumer wellbeing. With the low COVID statistics from Africa and especially Ghana, where home-made-mask were dominant during the lockdown period, compared to other countries, a further look at the efficacy of home-made masks and their use in preventing COVID-19 will deepen public understanding of the effectiveness of masks (Any mask is better than no mask). Finally, we proposed a model that can be adopted, contingent on further investigation.

Despite its initial reliability, the authors acknowledge the possibilities of deficiency or future modification and improvement in the scale. Also, a behavioral change tendency exists after the lockdown when people are accustomed to prevention protocols. The generalization of the findings should, therefore, be made cautiously.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather, it was funded by the personal efforts of the authors.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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