“The Role of Social Media Coverage of Climate Change Crisis on Risk Perception among Egyptian Users”

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ABSTRACT

This study investigates the role of social media in shaping climate change risk perception at both personal and societal levels. Drawing on the Impersonal Impact Hypothesis and the Climate Change Risk Perception Model (CCRPM), the study examines how exposure to climate change content on social media influences risk perception, with cognitive, affective, and experiential factors as mediators. A questionnaire survey was conducted with 411 social media users in Egypt who had been exposed to climate change content online. Structural Equation Modelling (SEM) was used to test the proposed pathways. Results showed that while exposure to climate change content had no significant direct effect on either personal or societal risk perception, significant indirect effects were observed through affective and experiential mediators in personal risk perception and affective, experiential and cognitive mediators in societal risk perception. These findings underscore the importance of emotional, experiential and cognitive engagement in shaping risk perception.

Additionally, the study revealed age as a significant predictor of risk perception, with younger users reporting higher levels of concern. The findings highlight the complex mechanisms through which social media shapes climate change risk perception and offer insights for designing more effective climate communication strategies.

KEYWORDS: Climate change communication, social media and risk perception, Climate change risk perception, Impersonal impact hypothesis, Public perception of climate change.

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دور تغطية وسائل التواصل الإجتماعي لأزمة تغير المناخ في إدراك الخطر لدى المستخدمين المصريين

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ملخص الدراسة :

تهدف هذه الدراسة إلى التعرف على دور وسائل التواصل الاجتماعي في التأثير على ادراك الأفراد للمخاطر المتعلقة بتغير المناخ، وذلك من خلال اختبار نموذج يربط بين التعرض لمحتوى تغير المناخ على وسائل التواصل الاجتماعي وبين إدراك مخاطره على المستويين الشخصي والمجتمعي .إستنادًا إلى فرضية التأثير غير الشخصي ونموذج إدراك مخاطر تغير المناخ أجرت الدراسة استبيانًا على عينة من 411 مستخدم لوسائل التواصل الاجتماعي تعرضوا لمحتوى يتعلق بتغير المناخ لتحليل العلاقة بين هذا التعرض) المتغير المستقل (وإدراك المخاطر الشخصية والمجتمعية) المتغيرات التابعة(، مع دراسة الأدوار الوسيطة للعوامل المعرفية، العاطفية، والتجريبية. وقد كشفت تحليلات النمذجة بالمعادلات الهيكلية أن التعرض لمحتوى تغير المناخ لم يكن له تأثير مباشر على ادراك الخطر على المستويين الشخصي و المجتمعي، إلا أن النتائج أظهرت وجود تأثيرات غير مباشرة من خلال العوامل الوسيطة الإدراكية والعاطفية والتجريبية .كما ظهر أن العمر كان المتغير الديموغرافي الوحيد الذي أثّر بشكل ملحوظ على الإدراك، حيث عبّر الأفراد الأصغر سنًا عن مستويات أعلى من القلق تجاه تغير المناخ. تؤكد هذه النتائج أهمية المشاعر والتجارب في تشكيل تصوّر المخاطر، وتبرز ضرورة التركيز على استراتيجيات تواصل ترتكز على التأثير العاطفي والخبرة الشخصية لتعزيز الوعي المناخي..

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INTRODUCTION:

Egypt is facing a mounting crisis as the impacts of climate change become increasingly evident. With the notable warming, with average annual temperatures rising at a rate of 0.53 degrees Celsius per decade, Egypt is expected to face heightened occurrences of heat waves, dust storms, Mediterranean coast storms, and extreme weather events (UNICEF, 2022). In their research which focused on predicting future temperature changes in Egypt using climate change model, Gado et al. (2022) have described Egypt as vulnerable to climate change and have showed their concerned with the rising temperatures in Egypt and their impacts. Despite its societal implications, climate change is difficult to be noticed and comprehended for most of the lay audiences. Being a complex and subtle issue, people often learn about it through the news media which by increased news coverage can raise public concern and awareness about climate change (Hase et al., 2021). Such awareness is needed in order to alter perceptions of risk of climate change to subsequently influence behaviours. As stated by Jenkin (2006), comprehending how individuals perceive and react to risks is crucial for influencing public responses to these risks and understanding how these perceptions influence behaviours. Referring to the risk of climate change, Wang et al. (2021) asserted that to tackle the challenges of climate change, it is critical to enhance climate change risk perception, as well as reducing climate change inaction. On the same line, Dong et al. (2023) have linked levels of risk perception about climate change with the readiness to act to mitigate it. "It is clear that climate change risk perception is an important antecedent of willingness to act." (p.1761) For example, whether people support or oppose climate policies depends largely on how they view the risks and dangers of climate change. (Leiserowitz, 2006)

Climate change risk perception has been widely studied as a measurable variable by researchers such as Leiserowitz (2006), van der Linden (2015, 2017), Elshirbiny (2018) and Elshirbiny and Abrahamse, (2020). Elshirbiny (2018) applied the Climate Change Risk Perception Model (CCRPM) to investigate the factors influencing climate change risk perception and attitudes toward

climate change adaptation in Egypt. Using an online survey in a snowball sample of 726 participants, and semi-structured interviews, the study concluded that participants express concerns about climate change, however, they reveal limited understanding and misconceptions regarding its causes, such as mistakenly linking climate change to the ozone layer. In this context, the media, especially social media, emerges as a pivotal resource that can significantly contribute to efforts aimed at enhancing public awareness and understanding of climate change risks. As asserted by Asgarizadeh et al. (2023) individuals often obtain information about climate change from both traditional and social media, which can shape their perceptions of the threat posed by climate change and either increase or decrease their anxiety levels.

The relationship between exposure to climate change contents on the media and levels of climate change worry and risk perception have been the focus of numerous studies. Applying a web-based survey to explore the role of media in climate change risk perception model among Australians' perception about health risks related to climate change, Thanker et al. (2023) suggest that media influence on climate change risk perception can occur through both direct and indirect means. According to them, media coverage can influence perceptions by providing information, reflecting awareness, linking events to climate change, and heightening concerns about the harmful impacts of climate change. In their study Media Use, Interpersonal Communication, and Personal Relevance as External and Internal representations of climate change, Rosenthal and Pengya Ai (2024) tested the relationship between traditional media and social media uses, along with interpersonal communication and perceived risk of climate change. Conducting a cross-sectional online survey on a sample of 4,006 adult in Singapore (n=1,997) and the United States (n=2,009), the study found that social media use have indirectly impacted the perceived risk of climate change, through perceived experience. Asgarizadeh et al., (2023) have studies exposure to media as one of the predictors of climate change anxiety, and results showed that exposure to climate change information in the media has significantly mediated the relation between prior experience and

climate change anxiety, where media can have a role in linking climate change experience to reported climate change impacts. Although, it did not mediate the relation between climate change knowledge and climate change anxiety, the researchers concluded that individuals who were more worried about climate change and its consequences tended to pay more attention to media information about climate change, and this was associated with increased climate anxiety.

Using insights from two theoretical frames Impersonal-Impact Hypothesis which suggests "media impact is found in studies examining judgments at the societal level but not in studies probing judgments at the personal level." (Tyler & Cook, 1984, p. 693) and Climate Change Risk Perception Model (CCRPM), which constructs an integrated model encompassing psychological, cultural, and social dimensions that influence climate change risk perception (van der Linden, 2015), the current study aims to inform a novel model that captures the comprehensive communication process of climate change within the Egyptian social media context. The model investigates the effects of exposure to social media climate change contents on users' perceptions of climate change risk and how various intermediating variables impact this relation.

The proposed model illustrating these relationships is presented in Figure (1), and it demonstrates a research hypothesis and a research question:

H1: There is a positive relationship between being exposed to climate change coverage on social media and societal risk perception of climate change among users.

RQ1: Is there a positive relationship between being exposed to climate change coverage on social media and personal risk perception of climate change among users

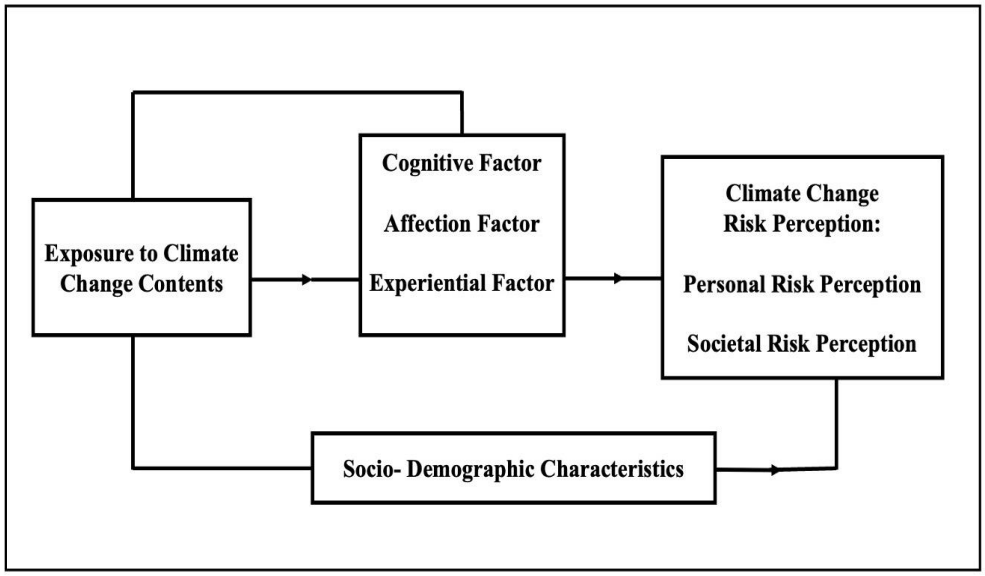

Figure (1), The Study Proposed Model

METHODOLOGY:

Research Design and Sampling:

This study adopted a quantitative research design using online survey administered to a non-probability purposive sample of 411 Egyptian social media users. Participants were selected based on the criterion of being exposed to climate change content on social media. This criterion was stated in the survey introduction, and only individuals who met it were invited to participate.

Operational Definitions:

The questionnaire has applied a combination of level of measurements to assess the variables of the study. Following are the operational definition for variables of the study:

Independent variable: *"Exposure to climate change contents"* is presented through 3 dimension related to participant's involvement with climate change contents on social media. These dimensions are:

1- Attention, which refers to attentively reading or watching climate change contents on social media.

2- Interest, which refers to seeking and searching for climate change contents on social media.

3- Attitude, which refers to perceiving social media as a source of information about climate change.

In the questionnaire, this variable is presented by a set of questions reflecting The Media and Technology Usage and Attitudes Scale (MTUAS) suggested by Rosen et al. (2013). According to the authors, the scale can be a method for measuring media and technology involvement across a variety of types of research.

Dependent variables, *"Personal risk perception" and "Societal risk perception" are* based on van der Linden's (2017) Hierarchy of Concern (HoC) Model, which present risk perception on four ranked levels: Likelihood Ratings; Perceived Seriousness; Generalised Concern and Personal Worry. these classifications is examined through both personal and societal dimensions of climate change risk perception using an index inspired by van der Linden (2014) and Elshirbiny (2018).

Intermediating variables:

- **"***Cognitive Factor"* measuring "actual knowledge" is based on the climate- related- knowledge scale, presented by Tobler et al. (2012) who indicated that the statements measuring causes of climate change- knowledge and consequences of climate change- knowledge suits for international applications. "Self-reported knowledge" is inspired by Roser-Renouf and Nisbet (2008) definition for self- assessed knowledge, as reflecting to what extend participants think they know, not what they actually know.

- *"Affection Factor"* is measured via an index inspired by Van der Linden (2013), following Peters and Solvic's measurement for self-reported affect, and was reapplied in research investigating climate risk perception determinants, (Elshirbiny, 2018; Elsherbiny & Abrahamse, 2020).

- *"Experimental Factor"* is inspired by the index presented by van der Linden (2015) and Elshirbiny (2018). Yet, as conducting the study in the field of media, the researcher thought it is important to highlight the role of media in this area and to what extend it is related to people thinking they are experiencing a form of climate change event and to what extend it is linking such events to the crisis of climate change. The time frame added to this question (in the last five years) was presented by van der Linden (2014) and El-Sherbiny (2018).

Data Analysis Techniques:

Data have been analysed statistically by Statistical Package for Social Science (SPSS; Version 26) and (R Studio) softwares. The variables of the study were developed by related statements in order to answer the proposed hypothesis and research question. Internal consistency of a scale, reflecting its reliability, was measured using Cornbach's Alpha coefficient takes values between 0 and 1. According to Griethuijsen et al. questionnaires are considered stable when the values exceed 0.6 (as cited in, El-Kabany et al., 2025). In addition, internal consistency in scale terms was measured using Composite Reliability (CR), showing how much the items used to measure a concept are related to each other, indicating they reflect the same underlying idea. According to Netemeyer et al. (2003) that it's "reasonable" for a narrowly defined construct with five to eight items to meet a minimum threshold of 0.50.

Confirmatory Factor Analysis (CFA) was employed to test the questionnaire's internal validity. Factor loading indicates the strength of the relationship between each factor and the observed variables measuring it. Statements were considered to be loaded in the corresponding construct when it was exceeding 0.5. Normality test to examine the variable distribution scale was done according to Shapiro-Wilk test and Kolmogorov-Smirnov tests

Correlation Analysis:

Correlations were determined using Pearson's correlation coefficients to measure the correlation between two numerical variables indicating the direction and the strength of the relation. A positive coefficient indicates a direct relationship, while a negative one shows an inverse relationship. The coefficient ranges from -1 to 1, with values between 0 and 0.3 indicating a weak relationship, 0.3 to 0.7 moderate, and above 0.7 strong. Significance is determined by comparing the p-value to a 5% level, with p-values below 0.05 indicating a significant relationship at 95% confidence.

Independent Samples t-Test:

To compare the means of a continuous variable between two independent groups, an independent samples t- Test was used to calculate the p- value. If the p-value is less than 0.05, the difference between groups is considered statistically significant.

Structural Equation Modeling (SEM):

Structural Equation Modelling (SEM) with a graphical path analysis tool was used to test the research hypotheses involving mediator variables. The model's fit was evaluated using several goodness-of-fit indices, including Incremental Fit Index (IFI), Relative Fit Index (RFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). The significance of the model paths is determined by p-values, while the strength of the paths is by the regression coefficients. Structural models were estimated using several methods, including maximum likelihood (ML) estimation, weighted least squares (WLS), and asymptotically distribution-free (ADF) methods. Mediation effects are confirmed when the independent variable has a significant effect on the mediator, and the mediator has a significant effect on the dependent variable.

RESULTS:

A total of 411 participants took part in this survey. The demographic characteristics of the sample are presented in (Table 1). Female respondents made up 63.7% of the sample, which is higher than their male counterparts who comprised 36.3%. Regarding educational background, 2.2% of the respondents had completed secondary school, 1.9% held a diploma, 64.2% had a bachelor's degree, and 31.6% had a postgraduate degree. In terms of respondents 'monthly income, 22.4% reported earning between 2,000 and less than 6,000 LE, 18.0% earned between 6,000 and less than 10,000 LE, another 18.0% earned between 10,000 and less than 14,000 LE, while the largest group, 41.6%, reported earning 14,000 LE or more. Regarding employment status, 73.7% of the respondents were employed, while 26.3% were unemployed. The participants 'ages ranged from 16 to 86 years, with a mean age of 41.15 years and a standard deviation of 12.34, indicating a relatively wide age distribution and reflecting diversity within the sample.

Table (1): Demographic Characteristics of 411 Respondents

Variable	Frequency	Percentage
Gender		
Female	262	63.7%
Male	149	36.3%
Educational Level		
Secondary School	9	2.2%
Diplomat	8	1.9%
Bachelor's Degree	264	64.2%
Postgraduate Degree	130	31.6%
Employment Status		
Unemployed	108	26.3%
Employed	303	73.7%
Monthly Income Level		
2,000 ≤ income < 6000 LE	92	22.4%
6,000 ≤ income < 10,000 LE	74	18.0%
10,000 ≤ income < 14,000 LE	74	18.0%
income ≥ 14,000 LE	171	41.6%
	(Minimum - Maximum)	Mean ±Std. Deviation
Age	(16 – 86)	40.91 ± 12.113

Based on respondents 'rankings of sources for climate change information, (Table 2), social media was the most frequently chosen as the top source, with 57.2% selecting it as their first choice. In contrast, only 0.7% ranked radio as their primary source. For the second rank, TV channels were the most preferred at 30.4%, while radio remained the least favored at 13.4%. At the third rank, news websites led with 28.0%, whereas social media and personal communication tied for the lowest at 10.2%. For the fourth rank, radio was ranked highest at 26.8%, with social media the least favored at 7.5%. In the fifth rank, newspapers were most commonly chosen at 22.1%, while social media again ranked lowest at 4.6%. Finally, at the sixth rank, personal communication topped the list with 36.3%, and TV channels were the least preferred at 2.4%.

Table (2): Ranking Sources of Information for Climate Change Content by 411 Respondents

Source /Ranking		1	2	3	4	5	6
Social Media	Frequency	235	51	42	31	19	33
	Percentage	57.2%	12.4%	10.2%	7.5%	4.6%	8.0%
Newspapers	Frequency	48	64	43	44	91	121
	Percentage	11.7%	15.6%	10.5%	10.7%	22.1%	29.4%
TV Channels	Frequency	54	125	108	77	37	10
	Percentage	13.1%	30.4%	26.3%	18.7%	9.0%	2.4%
Radio	Frequency	3	55	61	110	108	74
	Percentage	0.7%	13.4%	14.8%	26.8%	26.3%	18.0%
News Websites	Frequency	45	66	115	96	66	23
	Percentage	10.9%	16.1%	28.0%	23.4%	16.1%	5.6%
Personal Communication	Frequency	26	50	42	53	91	149
	Percentage	6.3%	12.2%	10.2%	12.9%	22.1%	36.3%

Descriptive analysis of the platforms through which respondents encountered climate change content (Table 3) shows that Facebook was the most frequently reported source, with (63.5%) of respondents indicating they had seen climate change-related content on this platform. Instagram followed with (10.5%), while YouTube (9.5%) and Twitter (9.2%) showed relatively similar levels of exposure. TikTok had the lowest reported engagement, with only (1.9%) of respondents encountering climate change content there. Additionally,

(5.4%) of respondents reported using other platforms, including Google, LinkedIn, Telegram, and others, to access such content.

Table (12): Direct, Indirect, and Total Effects

Table (12): Direct, Indirect, and Total Effects	Frequency	Percentage
Table (12): Direct, Indirect, and Total Effects	38	9.2%
Table (12): Direct, Indirect, and Total Effects	39	9.5%
Table (12): Direct, Indirect, and Total Effects	261	63.5%
Table (12): Direct, Indirect, and Total Effects	43	10.5%
Table (12): Direct, Indirect, and Total Effects	8	1.9%
Table (12): Direct, Indirect, and Total Effects	22	5.4%
Table (12): Direct, Indirect, and Total Effects	411	100.0%

Descriptive analysis of the study construct *"Exposure to Climate Change Contents"* (Table 4) shows that respondents tend to answer with *"Sometimes"* to the statements related to the exposure to climate change contents on social media as the mean value ranges from 1.5 to 2.0, with a standard deviation of about 0.486. The statement with the highest agreement is "They have read or watched climate change content attentively on social media," while the statement with the lowest agreement is "They have searched for climate change content on social media." This indicates that respondents were more likely to pay attention to climate change content when they encountered it on social media, rather than actively searching for it.

Table (4): Descriptive Analysis of "*Exposure to Climate Change Contents*" of 411 Respondents.

	Minimum	Maximum	Mean	Standard Deviation
Exposure to Climate Change Contents	1	3	1.950	0.486
I have read or watched climate change content attentively on social media	1	3	2.170	0.543
I have searched for climate change content on social media	1	3	1.720	0.669
I have relied on social media as a primary source of information about climate change	1	3	1.970	0.751

This Descriptive analysis of the construct *"Personal Risk Perception"* (Table 5) shows that respondents generally somewhat agree with the statements representing this construct. The statement "I am worried about the negative effects of climate change" received the highest agreement, with a mean value of 3.770, while respondents were slightly above neutral regarding the statement "The effects of climate change pose a significant threat to me personally," which had a mean value of 3.210.The same statement had the highest standard deviation of 0.994 which indicates that respondents 'answers varied widely, spreading around the neutral option. Controversy, the most homogeneous statement, with the lowest variance, is "It is likely that my life, health, and well-being will be at risk due to climate change," which has a standard deviation of 0.853.

Table (5): Descriptive Analysis of "*Personal Risk Perception*" of 411 Respondents

	Minimum	Maximum	Mean	Standard Deviation
Personal Risk Perception	1	5	3.560	0.738
It is likely that my life, health, and well-being will be at risk due to climate change	1	5	3.760	0.853
Climate change has serious effects on my personal life	1	5	3.500	0.854
I am worried about the negative effects of climate change	1	5	3.770	0.858
The effects of climate change pose a significant threat to me personally	1	5	3.210	0.994

For the construct "*Societal Risk Perception*," the descriptive analysis in (Table 6) shows that respondents tend to agree most strongly with the statement, "Climate change has a threatening impact on the world as a whole," which has a mean value of 4.090. The statement with the lowest agreement is "Climate change is a concerning phenomenon for my community," with a mean value of 3.700, indicating somewhat less agreement. The most homogeneous statement, showing the lowest variance, is "It is likely that climate change will have impacts on Egypt," with a standard deviation of 0.776. Conversely, the most

heterogeneous statement, with the highest variance, is "Climate change is a concerning phenomenon for my community," which has a standard deviation of 0.895.

Table (6): Descriptive Analysis of "*Societal Risk Perception*" of 411 Respondents

	Minimum	Maximum	Mean	Standard Deviation
***Societal* Risk Perception**	1	5	3.920	0.708
It is likely that climate change will have impacts on Egypt	1	5	3.990	0.776
Climate change has a threatening impact on the world as a whole	1	5	4.090	0.799
Climate change is a concerning phenomenon for my community	1	5	3.700	0.895
I believe that the effects of climate change are harmful to Egypt	1	5	3.900	0.862

Descriptive analysis of the construct *"Cognitive Factor"* (Table 7) shows actual climate change knowledge mean values ranging between 0.660 and 1.780 suggesting that more people answered correctly than incorrectly across most items. The relatively low standard deviation 0.189 implies that responses were fairly consistent across respondents. For self-reported knowledge, respondents tended to express neutral views about their perceived knowledge of climate change, with a mean value of 2.840 and a standard deviation of 0.850.

Table (7): Descriptive Analysis of *"Cognitive Factor"* of 411 Respondents

	Minimum	Maximum	Mean	Standard Deviation
Cognitive Factor	0	0.98	0.563	0.189
Over the past 250 years, CO2 concentration in the atmosphere has increased	0	2	1.480	0.865
Human activity is primarily responsible for greenhouse gas emissions leading to global warming	0	2	1.780	0.580
CO2 is likely the main cause of climate change	0	2	1.350	0.891
Natural changes, such as variations in solar radiation, are major causes of climate change	0	2	1.140	0.936

	Minimum	Maximum	Mean	Standard Deviation
The 1990s were the warmest decade of the last century	0	2	0.760	0.835
The current global concentration of CO2 was present throughout previous centuries	0	2	0.700	0.674
In the coming decades, scientists expect an increase in extreme climate events, such as famines, floods, and hurricanes	0	2	1.690	0.690
In the coming decades, scientists expect that warmer temperatures will melt polar ice, leading to a rise in sea levels	0	2	1.670	0.700
In the coming decades, scientists expect a cooling of the climate	0	2	0.720	0.698
In the coming decades, scientists expect warmer temperatures to increase evaporation, which will generally decrease sea levels	0	2	0.940	0.848
In the coming decades, scientists expect climate change to be evenly distributed across the globe	0	2	0.820	0.738
In the coming decades, scientists expect an increase in precipitation evenly across all regions worldwide	0	2	0.660	0.688
Do you feel you have complete knowledge about climate change issues?	1	5	2.840	0.850

Descriptive Analysis for *"Affection Factor"* construct (Table 8) indicates that respondents tend to be "neutral" with the statements related to the affection factors as the mean value ranges from 2.5 to 3.5 with a standard deviation of about 0.502. The statement with the highest agreement is that "They feel sad about what is happening due to climate change" while the statement with the lowest agreement is that "They feel indifferent towards news about the effects of climate change". The homogeneous statement, with the lowest variance, is that "They feel sad about what is happening due to climate change" while the non-homogeneous statement, with the highest variance, is that "They feel panic when exposed to content about the impacts of climate change".

Table (8): Descriptive Analysis of *"Affection Factor"* of 411 Respondents

	Minimum	Maximum	Mean	Standard Deviation
Affection Factors	1	5	3.058	0.502
I feel sad about what is happening due to climate change	1	5	4.020	0.826
I feel anxious when I hear news related to the effects of climate change	1	5	3.610	0.895
I feel indifferent towards news about the effects of climate change (Reversed)	1	5	2.080	0.965
I feel panic when exposed to content about the impacts of climate change	1	5	2.530	1.025

For the construct "*Experiential Factor"* (Table 9) shows that respondents tend to indicate they "sometimes" have experience with climate change impacts, with a few saying they "always" do as the mean value ranges from 2.5 to 3.5 with a standard deviation of about 0.654. The statement with the highest agreement is that "In the past five years, people in their community have experienced climate change phenomena (e.g., severe floods, heatwaves, or cold spells)" while the statement with the lowest agreement is that "Social media coverage has highlighted the impact of extreme climate events on Egypt." The homogeneous statement, with the lowest variance, is that "in the past five years, people in their community have experienced climate change phenomena (e.g., severe floods, heatwaves, or cold spells)" while the non-homogeneous statement, with the highest variance, is that "Social media coverage has highlighted the impact of extreme climate events on Egypt" indicating mixed insights about social media covering such events.

Table (9): Descriptive Analysis of *"Experiential Factor"* of 411 Respondents

	Minimum	Maximum	Mean	Standard Deviation
Experiential Factor	1	4	3.049	0.654
In the past five years, I have personally experienced climate change phenomena (e.g., severe floods, heatwaves, or cold spells)	1	4	3.030	0.800
In the past five years, people in my community have experienced climate change phenomena (e.g., severe floods, heatwaves, or cold spells)	1	4	3.090	0.745
Social media coverage has highlighted the impact of extreme climate events on Egypt	1	4	3.020	0.847

INFERENTIAL STATISTICS:

Correlation Analysis:

The results of two normality tests; Kolmogorov Smirnov and Shapiro-Wilk" indicated that all study variables were not normally distributed, however with a sample size of 411 responses, above the recommended threshold of 30 to 50 participants (Sekaran, 2003) parametric tests remain appropriate in this research.

Pearson's Correlation Coefficient presented in (Table 10) illustrates there is a significant weak positive relationship between exposure to climate change contents and personal risk perception (correlation coefficient = 0.176 and p-value <0.05). Also, there is a significant weak positive relationship between exposure to climate change contents and societal risk perception (correlation coefficient=0.126 and and p-value <0.05). Further, there is a significant weak positive relationship between the exposure to climate change contents and cognitive factors (correlation coefficient =0.224 and p-value <0.05). However, there is no significant relationship between the exposure to climate change contents and affection factor (correlation coefficient =0.090 and p-value >0.05) and experiential (correlation coefficient =0.087 and p-value is > 0.05) .

Table (10): Pearson's Correlation Coefficients

Variables	Exposure to Climate Change Contents	Personal PR	Societal RP	Cognitive Factor	Affection Factor	*Experiential Factor*
Exposure to Climate Change Contents	1					
Personal PR	0.176**	1				
Societal RP	0.126**	0.752**	1			
Cognitive Factor	0.224**	0.184**	0.204**	1		
Affection Factor	0.090	0.402**	0.322**	0.140**	1	
Experiential Factor	0.087	0.229**	0.206**	0.192**	0.029	1

** Correlation is significant at the 0.01 level (2tailed).

* Correlation is significant at the 0.05 level (2-tailed).

There is a significant weak positive relationship between personal risk perception and cognitive factors (correlation coefficient =0.184 and p-value >0.05). However, there is a significant moderate positive relationship between the personal risk perception and affection factors (correlation coefficient =0.402 and p-value >0.05). There is a significant weak positive relationship between personal risk perception and experiential factors (correlation coefficient =0.229 and p-value >0.05). There is a significant weak positive relationship between societal risk perception and cognitive factors (correlation coefficient =0.204 and p-value >0.05). However, there is a significant moderate positive relationship between societal risk perception and affection factors (correlation coefficient = 0.322 and p-value >0.05). There is a significant weak positive relationship between the societal risk perception and experiential factors (correlation coefficient = 0.206 and p-value >0.05). A comparison of means revealed a significant difference between males and females in their exposure to climate change content, with females reporting significantly higher exposure than males (p = 0.005, at the 95% confidence level). However, no significant gender differences were observed in either

personal or societal risk perception (p-values 0.741 and 0.584 respectively) indicating that both males and females reported similar levels of risk perception. Educational level did not significantly impact exposure to climate change contents, personal or societal risk perception (p-values of 0.13, 0.809, and 0.486, respectively). For respondents' monthly income between individuals with a monthly income 10,000 EGP or more and those with less than 10,000 EGP in the affection factors (p=0.002, at the 95% confidence level). This indicates that individuals with higher incomes experience stronger emotional or affective responses toward climate change content. However, the remaining constructs do not differ significantly based on income. Also, a significant difference was observed between employed and unemployed respondents in their exposure to climate change content, with unemployed individuals reporting higher exposure (p = 0.0043, at the 95% confidence level). In contrast, employment status did not lead to significant differences in personal or societal risk perception (p-values of 0.857 and 0.349 respectively).

SEM Analysis and Testing Hypotheses

Structural Equation Modelling (SEM), supported by path analysis, was used to test the relationships between the independent variable (Exposure to climate change contents) and the dependent variables (Personal and Societal risk perception) of the study in the presence of mediator variables (Cognitive factor, Affection factor and Experimental factor) and Socio- Demographic variables.

As illustrated in (Figure 2), First Path Analysis examining the relationship between exposure to climate change content and personal risk perception reveals no significant direct effect. However, exposure to climate change content has significant direct positive effects on several intermediary factors, including the cognitive factor (path coefficient = 0.277), affection factor (path coefficient = 1.483) and experiential factor (path coefficient = 1.479). In turn, significant positive relationships were found between these intermediary variables and personal public risk perception, specifically through the affection factor (path coefficient = 0.486) and experiential factor (path coefficient = 0.184). Age was found to have a significant negative

effect on personal risk perception (path coefficient = -0.005, $p < 0.05$), indicating that each additional year of age corresponds to a 0.005-unit decrease in perceived climate risk. In contrast, other control variables, including gender, education level, monthly income and employment status, showed no significant effect on personal risk perception at the 95% confidence level

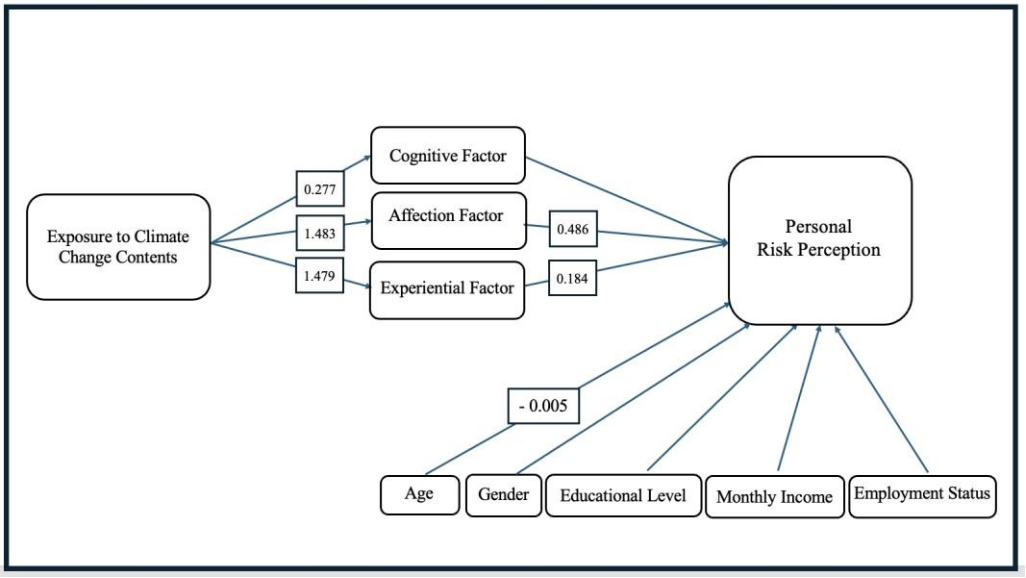

Figure (2): First Path Diagram

Second Path Analysis detecting the relationship between exposure to climate change contents and societal risk perception illustrated in (Figure 3) shows no significant direct effect. Nevertheless, exposure to climate change contents exhibits significant direct positive effects on several intermediary variables, including cognitive factor (path coefficient = 0.277), affection factor (path coefficient = 1.483) and experiential factor (path coefficient = 1.479). These intermediary variables, in turn, show significant positive associations with societal risk perception, specifically through the cognitive factor (path coefficient = 0.305), affection factor (path coefficient = 0.372) and experiential factor (path coefficient = 0.168). Age demonstrates a significant negative effect on societal risk perception (path coefficient

= -0.005, $p < 0.05$), indicating that with each additional year, perceived climate risk decreases by 0.005 units. However, other control variables, including gender, education level, monthly income and employment status, exhibit no significant effect on societal risk perception at the 95% confidence level.

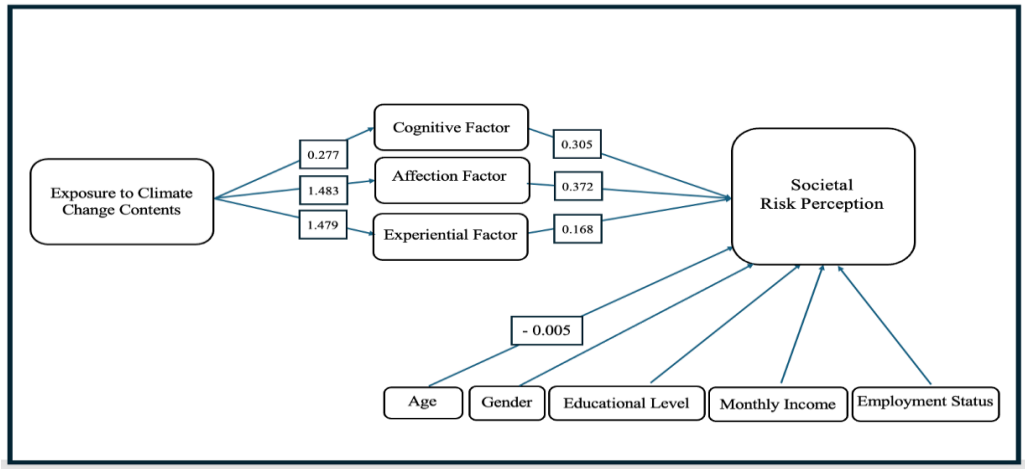

Figure (3): Second Path Diagram

The detailed results for both pathways are presented in (Table 11) below.

Table (11): Path Coefficients and Significances for Path Analysis (1) and (2)

Structural Path	Path Coefficient	C.R (t-value)	Std. Error	Sig.
Cognitive factors <--Exposure	0.277	54.382	0.005	***
Affection factors <-- Exposure	1.483	70.497	0.021	***
Experiential factors <-- Exposure	1.479	63.885	0.023	***
Personal risk perception <-- Cognitive factors	0.164	1.109	0.148	0.268
Personal risk perception <-- Affection factors	0.486	13.590	0.036	***
Personal risk perception <-- Experiential factors	0.184	5.645	0.033	***
Personal risk perception <-- Exposure	0.155	1.406	0.110	0.160
Personal risk perception <-- Gender	0.071	1.129	0.063	0.259
Personal risk perception <-- Age	-0.008	-3.601	0.002	***
Personal risk perception <-- Educational Level	0.036	0.585	0.062	0.558

Structural Path	Path Coefficient	C.R (t-value)	Std. Error	Sig.
Personal risk perception <-- Monthly income	0.021	0.345	0.061	0.730
Personal risk perception <-- Employment Status	0.001	0.015	0.067	0.988
Societal risk perception <-- Cognitive Factors	0.305	2.106	0.145	0.035
Societal risk perception <-- Affection factors	0.372	10.602	0.035	***
Societal risk perception <-- Experiential factors	0.168	5.278	0.032	***
Societal risk perception <--Exposure	0.094	0.873	0.108	0.383
Societal risk perception <-- Gender	0.067	1.088	0.062	0.277
Societal risk perception <-- Age	-0.005	-2.323	0.002	0.020
Societal risk perception <-- Educational Level	0.023	0.374	0.061	0.709
Societal risk perception <-- Monthly income	0.080	1.329	0.060	0.184
Societal risk perception <-- Employment Status	-0.085	-1.298	0.065	0.194

The total effect (Table 12) combines significant direct and indirect effects of exposure to climate change content risk perception in the first and the second paths, shows full mediating effects. For personal risk perception, the total effect of exposure to climate change content is 0.993, at the 95% confidence level. Similarly, for societal risk perception, the total effect of exposure to climate change content is 0.884 at the 95% confidence level.

Table (12): Direct, Indirect, and Total Effects

Model	Direct Effect	Indirect Effect			Total Effect	Interpretation
		Cognitive	Affection	Experiential		
Personal risk perception <-- Exposure	-	-	0.721	0.272	0.993	Full Mediation
Societal risk perception <-- Exposure	-	0.084	0.552	0.248	0.884	Full Mediation

The overall fit of the model was evaluated using multiple goodness-of-fit indices, all of which met the recommended criteria, indicating a satisfactory model fit. Normal Fit Index (0.963), Relative Fit Index (0.969), Incremental Fit Index (0.939), Tucker-Lewis Index (0.951), and Comparative Fit Index (0.981). All these indices exceed the commonly accepted threshold of 0.90. Additionally, the Root Mean

Square Error of Approximation (0.012), well below the recommended cutoff value of 0.05, further supporting the model's good fit.

DISCUSSION:

Social media is not merely a platform for accessing information, news, and communication; it also significantly influences how people perceive current and urgent societal issues. It plays a pivotal role in impacting public awareness of crises and risks. This study aimed to investigate the role of social media in the communication process regarding climate change, specifically testing a proposed model to understand how exposure to climate change content on social media influences climate change risk perception at both personal and societal levels.

A questionnaire was conducted with a sample of 411 social media users who had been exposed to climate change content online. The survey examined the relationship between this exposure (independent variable) and both personal and societal climate change risk perception (dependent variables), while also analysing the mediating roles of cognitive, affective and experiential factors. The questionnaire included a variety of measurement items, which were reviewed and validated by experts in media, psychology, and statistics. Data was analysed using SPSS v26 and R Studio. The reliability analysis showed Cronbach's Alpha values of 0.762 for the independent variable (exposure to climate change content), and 0.847 and 0.871 for the two dependent variables (personal and societal risk perceptions respectively), which exceed the minimum threshold of 0.7, as recommended by Nunnally and Bernstein (as cited in El-Kabany et al., 2025). Confirmatory Factor Analysis (CFA) results confirmed the internal validity of the questionnaire, with all item loadings exceeding 0.50 and Average Variance Extracted (AVE) values above the recommended threshold of 0.50.

The study found that social media was the most frequently chosen primary source of climate change information, with 57.2% selecting it as their top source, significantly higher than television, chosen by 30.4% of respondents. This highlights the growing importance of

social media over traditional media for climate communication. Descriptive analysis showed that the highest agreement was with the statement: *"I have read or watched climate change content attentively on social media."* Conversely, the lowest agreement was with: *"I have searched for climate change content on social media."* This suggests that users are more likely to engage with climate content when they encounter it passively, rather than actively seeking it out. As Veltri and Atanasova (2017) argue, this reflects the dynamic nature of social media engagement and its implications for how the public consumes scientific information. The statement with the highest variance in responses was: *"I have relied on social media as a primary source of information about climate change,"* with a standard deviation of 0.751. This variance indicates that social media as a primary source of climate information is a polarising issue among respondents. It suggests differing levels of trust or preference in using social media for such content. This result aligns with the Positive Attitude sub-scale of the Media and Technology Usage and Attitudes Scale (MTUAS), which detects confidence, and willingness to use media or technology for communication and information. The variance in the responses suggests that while some users have positive attitude for social media for climate information, others remain skeptical about this role.

In this study, climate change risk perception was measured at both personal and societal levels, guided by the Hierarchy of Concern (HoC) Model, which categorises risk perception into four ranked dimensions: Likelihood Ratings, Perceived Seriousness, Generalised Concern, and Personal Worry. For personal risk perception, the statement with the lowest level of agreement was *"The effects of climate change pose a significant threat to me personally"*, which falls under the Personal Worry category and had a mean score of 3.210. This dimension sits at the top of the HoC pyramid, representing the most psychologically proximate and least endorsed form of risk perception. The relatively low score suggests that individuals tend to perceive climate change as a threat to others rather than to themselves. In contrast, the statement with the highest agreement was *"I am worried about the negative effects of climate change"*, with a mean score of 3.770, corresponding to the Generalized Concern dimension

of the HoC model. This indicates that respondents are more comfortable expressing concern about climate change in general terms, rather than acknowledging it as a direct personal threat.

The most homogeneous statement was *"It is likely that my life, health, and well-being will be at risk due to climate change"* failing under the Likelihood dimension, with a standard deviation of 0.853, indicating general consistency in responses. Conversely, the most heterogeneous statement was again*"The effects of climate change pose a significant threat to me personally"*, with a standard deviation of 0.994. This further underscores the controversial and divisive nature of personal worry about the issue of climate change, with respondents expressing a wide range of opinions.

Regarding societal risk perception, the statement with the highest level of agreement was *"Climate change has a threatening impact on the world as a whole"*, corresponding to the Perceived Seriousness dimension of the HoC model, with a mean score of 4.090. In contrast, the lowest agreement was with the statement *"Climate change is a concerning phenomenon for my community"*, which falls under the Generalised Concern dimension and had a mean score of 3.700. These findings suggest that while respondents recognise the severity of climate change on a global scale, they express relatively lower concern at the local or community level. This reflects a tendency to perceive climate change as a distanced threat, more strongly associated with global impacts than with immediate or localised consequences.

Structural Equation Modelling (SEM), supported by path analysis, was used to test the relationships between exposure to climate change contents and personal and societal risk perception in the presence of Cognitive, Affection and Experimental factors, as well as socio-demographic variables. However, exposure measure in this study is more about the level of involvement with climate change on social media contents and not merely being exposed to the content.

The first Path Analysis examining the relationship between exposure to climate change content and personal risk perception reveals no

significant direct effect. Such results goes with the impersonal impact hypothesis, which states that exposure to risk messages on the media can impact societal risk perception more than personal risk perception. According to Tyler and Cook (1984) testing the hypothesis on a variety of social and environmental risks stated "no significant effect on personal level" (p.704) yet this hypothesis was not supported in our study as related to exposure to climate change content and societal risk perception, for no significant impact was reported on the societal climate change risk perception construct studied in this study. However, the impacts of exposure to climate change contents on social media was proved to have significant impacts with the presence of mediating variables, specifically through the affection and experiential factors. This result can give an example to what Tyler and Cook (1984) have been anticipating stating that "we believe that under some conditions the media probably can affect judgments about one's own life." (p.705) In contrast to what was suggested by the impersonal impact hypothesis, exposure to media contents had no significant impact on societal risk perception, however this relationship could be counted in the presence of the intermediating variables, Cognitive, Affection and Experimental factors.

The indirect, mediated relationship between exposure to climate change content on social media and both personal and societal risk perception can be better understood through the lens of the Climate Change Risk Perception Model (CCRPM), which was developed to identify the factors influencing climate change risk perception. The Structural Equation Modelling (SEM) conducted in this study revealed that the cognitive factor (i.e., climate change knowledge) did not significantly mediate the relationship between exposure and personal risk perception, but it did mediate the relationship with societal risk perception. This finding aligns with the CCRPM, as van der Linden (2015) noted that while knowledge plays a significant role in shaping climate change risk perception, its impact is largely confined to societal-level perception. As van der Linden (2015) explains, "This seems to suggest that general knowledge about climate change may not readily map onto a personalized sense of risk" (p. 121). The lack of effect on personal risk perception, despite exposure to climate

change content, could be attributed to the way climate change is typically presented, often in general terms rather than through personal experience or direct impact. This explanation is reflected by Thaker et al. (2023), who found that variation in health-related risk perception from climate change was linked to exposure to climate change news, "which then helps the public make sense of the health risks associated with climate change" (p. 7).

In the mediated relationship between exposure to climate change content and climate change risk perception, the affection factor emerged as the most powerful mediating variable compared to cognitive and experiential factors. It showed path coefficient values of 0.721 and 0.552 in mediating the relationship with personal and societal risk perception, respectively. This finding provides strong evidence for the critical role of affect and emotions in shaping risk perception. It aligns with van der Linden's (2015) development of the CCRPM, which concluded that "holistic affect is the single most important predictor of both personal as well as societal risk perceptions of climate change" (p. 121). This result is further supported by theoretical concepts such as the Risk-as-Feelings Hypothesis, which emphasizes emotional appraisals as key influences in risk assessment, and the Affect Heuristic, which explains how affective responses significantly shape individuals 'perceptions of risk.

The experiential factor showed a statistically significant impact on the relationship between exposure to climate change content and both personal and societal risk perception. However, its effect was modest, with path coefficient values of 0.272 for personal risk perception and 0.248 for societal risk perception, suggesting a slightly stronger influence on personal perception. This aligns with van der Linden's (2015) assertion that an explicit perceptual link must be made for individuals to causally attribute their experiences to climate change. In the present study, the relatively weak impact of personal experience of climate change on risk perception, even among participants exposed to various levels of climate change content, may suggest that media

coverage fails to connect individuals' lived experiences of weather events with the broader climate change crisis.

In terms of socio-demographic variables, age was the only factor found to significantly influence both personal and societal risk perception. Interestingly, this influence was negative, indicating that younger participants expressed greater concern about climate change. This finding contrasts with Elshirbiny's (2018) study on climate change predictors in Egypt, which concluded that climate change concern increases with age. The differing results may stem from the characteristics of the sample. The sample of the current study used a purposive sample of individuals exposed to climate change content on social media. As social media tends to be more widely used by younger generations, they may be more engaged with climate change information online, leading to greater awareness and concern.

CONCLUSION:

This study explored the role of social media in shaping climate change risk perception at both personal and societal levels. Guided by the Climate Change Risk Perception Model (CCRPM) and the Impersonal Impact Hypothesis and using a Structural Equation Modelling (SEM) framework the research findings underscore the complex and multifaceted nature of how individuals engage with climate change content on social media and how such level of engagement with climate change content on social media translates, directly or indirectly, into perceived risks.

While directly, levels of exposure to climate change content on social media did not significantly influence personal or societal risk perception, the inclusion of mediating factors revealed meaningful indirect effects. Most notably, affection emerged as the strongest mediator, highlighting the pivotal role of emotional responses in the climate change risk perception. Experiential factors also contributed to risk perception, though to a lesser degree, suggesting that lived experiences play a role only when individuals can cognitively associate those experiences with climate change. However, cognitive factors primarily mediated societal risk perception, supporting the

notion that general knowledge is more likely to inform abstract or collective concerns rather than personal worry.

The findings also highlighted the role of age in the relationship between exposure to climate change content and both personal and societal climate change risk perception. Younger users reported higher levels of concern, which aligns with digital engagement trends, as they are more frequently exposed to, and potentially more influenced by, online climate discourse.

In sum, this research demonstrates that varying levels of exposure to social media content alone are insufficient to influence climate change risk perception unless the content engages individuals on an emotional, experiential, or cognitive level. Importantly, the findings highlight the importance of affect-driven communication strategies for enhancing public concern and encouraging climate action particularly within digital spaces.

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