# Risk perception and behavioral responses related to COVID-19 among the Iranian general population: An application of the extended parallel process model

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# Introduction: Fear appeal

- Fear is a negative drive,  an unpleasant state.
- People would want to get rid of that unpleasant feeling of fear.
- They perform the recommended behavior to eliminate the threat.
- So, they find the performance rewarding because it removed the unpleasant state of fear.

# The Extended Parallel Process Model (cont.)

- Two distinct processes in response to fear appeal:
- A danger control process and a fear control process.
- It was criticized for lacking specificity and predictive power.
- The EPPM suggests health risk messages initiate two cognitive appraisals:
- EPPM
  - An appraisal of the threat
  - An appraisal of the efficacy of the recommended response.

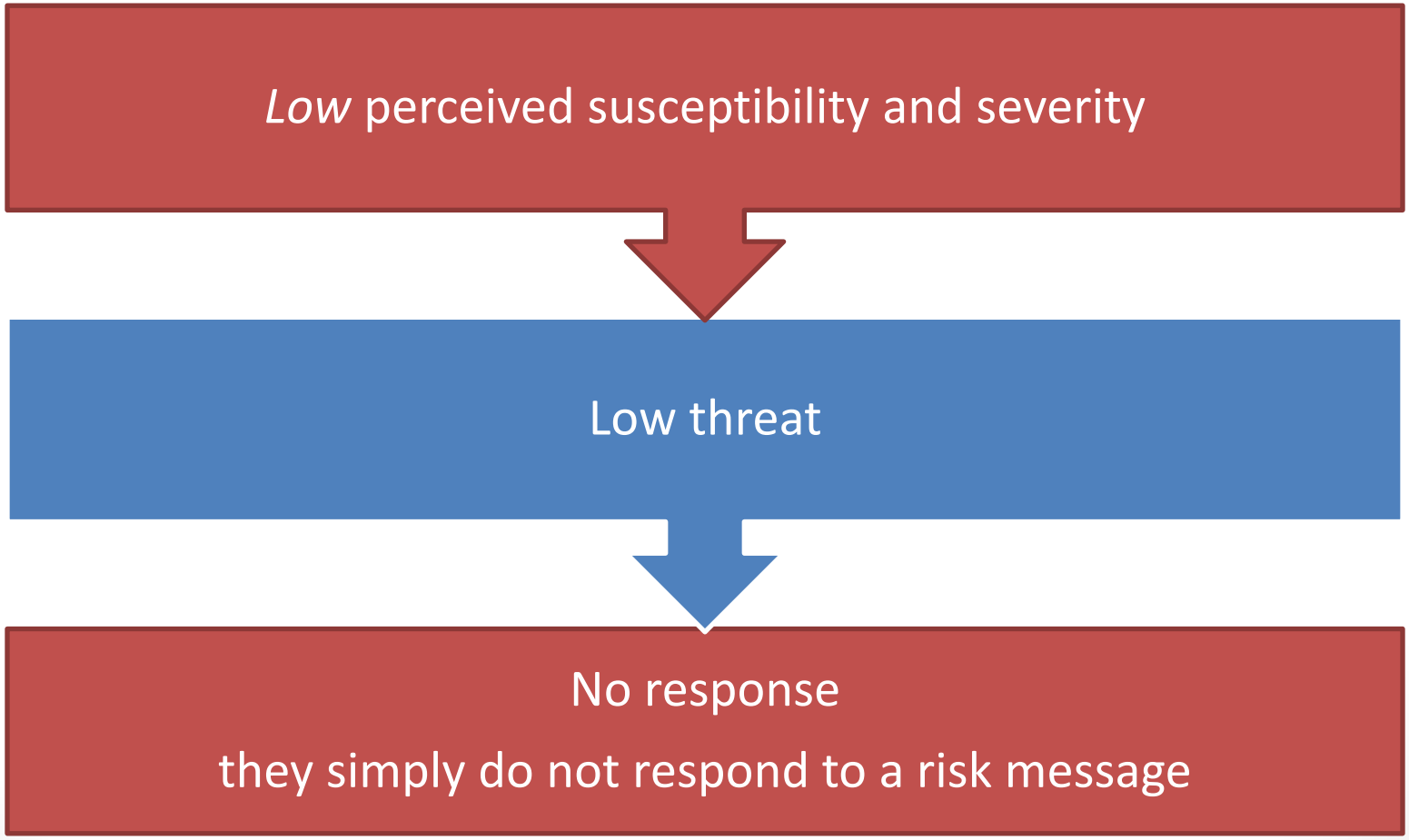
# EPPM (cont.)

- The first cognitive appraisal is of the threat.
- Cognitive appraisal is "thinking about an issue”.
- when presented with a health risk, people first think about whether it is relevant to them (e.g., “am I at risk for experiencing this threat”: perceived susceptibility).
- and whether the threat is significant (e.g., "could I be significantly harmed by this threat?"— perceived severity)

# EPPM (cont.)


people do not process any further information about the threat.
They just ignore it
they don't respond to the risk message
Threat: irrelevant/trivial

# EPPM (cont.)


*Low* perceived susceptibility and severity
Low threat
No response
they simply do not respond to a risk message

# EPPM (cont.)

**Appraise the threat**

- Think about the threat.
- Believe they are vulnerable to threat.
- It could lead to serious harm.

**Perceived threat**

- The greater the fear, the stronger the motivation to do something about it.

**Appraise the recommended response**

- Think about the efficacy of the recommended response.

**Response**

- Danger control
- Fear control

# The Extended Parallel Process Model

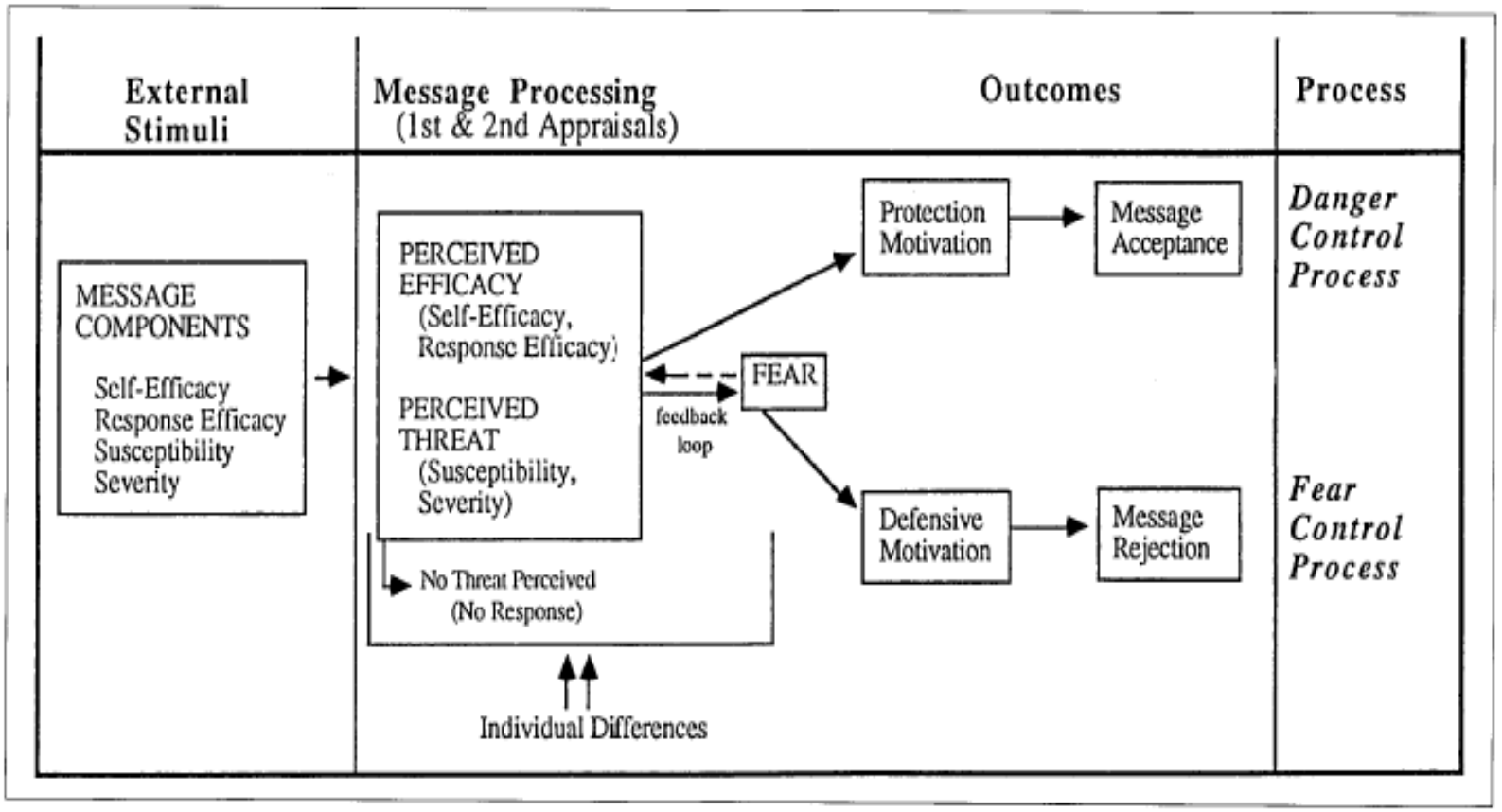



**Figure 3.1** The Extended Parallel Process Model (EPPM)

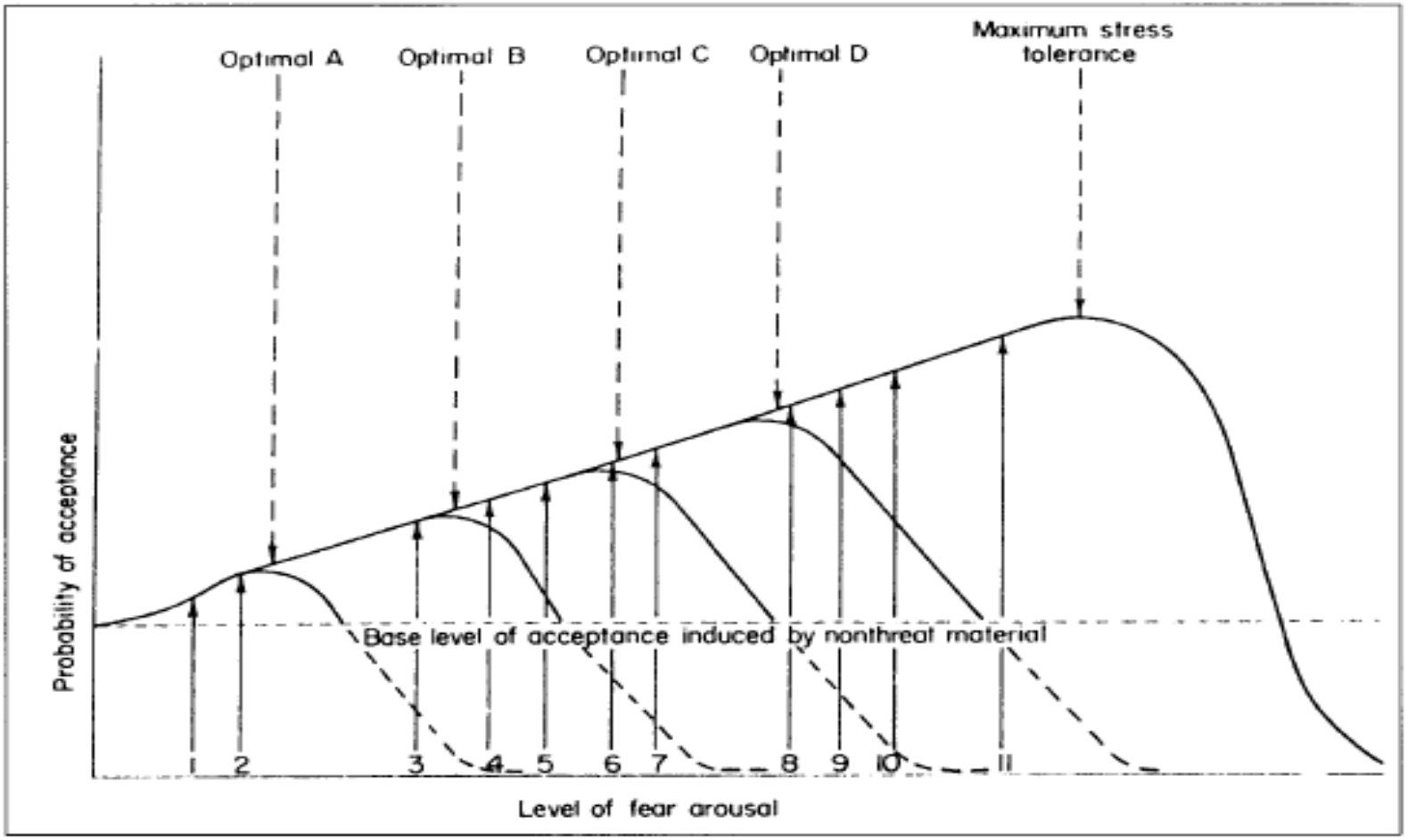



**Figure 2.1** Curvilinear relationship between fear and behavior change

# EPPM constructs

- **Perceived threat** is comprised of two underlying dimensions, severity and susceptibility.
- **Perceived Susceptibility** Beliefs about one's risk of experiencing the threat (e.g., I'm at risk for COVID-19).
- **Perceived severity** Beliefs about the significance or magnitude of the threat (e.g., "COVID-19 is a sever disease").

# EPPM constructs

- **Efficacy** : Efficacy pertains to **the effectiveness, feasibility**, and **ease of a recommended response** in impeding or averting a threat.
- **Perceived efficacy** is response efficacy and self-efficacy.
- **Response efficacy**: Beliefs about the effectiveness of the recommended response in deterring the threat (e.g., “Masks work in preventing Corona” or “Regular hand washing prevents Corona” ).
- **Self-efficacy**: Beliefs about one's ability to perform the recommended response to avert the threat (e.g., “I am able to use mask in the closed places with more than two people.”).

# EPPM constructs : defensive responses

- Denial of threat: “I think sickness or death are in God’s hands, and following the precautionary measures isn’t important.”
- Defensive avoidance: “When Television or Radio talks about Corona, I flip the channel” Or “I’m not interested in hearing about Corona”.
- Reactance: “I believe that health staff have highly exaggerated this disease” or “I believe that this is a government plan, they are trying to amuse people”.

# Aim of study

- This study aims to investigate:

- How people have perceived the COVID-19 outbreak using the components of EPPM (i.e., recommended response efficacy, self-efficacy, susceptibility, and severity).

-How their behavioral responses contributed to the prevention and control of the disease.

- Defensive responses (denial, avoidance, and reactance) to the threat of COVID-19.

# Methodology

- Study design: online cross-sectional study.
- Participants: general population (aged 15 years and over ).
- Recruitment: using online applications and posts on platforms such as Telegram, WhatsApp, and Instagram.
- The study tool: the Risk Percept COVID-19 questionnaire.

# Results : Socio-demographic characteristics of respondents (n=3727)

| | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| Age \| Mean (SD) in years | 38.2 (11.2) | 35.7 (10.9) | 37.0 (11.1) |
| 15-29 | 376 (19.5) | 489 (27.3) | 865 (23.2) |
| 30-44 | 1051 (54.4) | 944 (52.6) | 1995 (53.5) |
| 45-59 | 419 (21.7) | 315 (17.6) | 734 (19.7) |
| 60+ | 87 (4.5) | 46 (2.6) | 133 (3.6) |
| Educational status | | | |
| Illiterate | 9 (0.5) | 7 (.4) | 16 (0.4) |
| Elementary school | 16 (.8) | 32 (1.8) | 48 (1.3) |
| Guidance school | 74 (3.8) | 64 (3.6) | 138 (3.7) |
| Secondary school | 458 (23.7) | 465 (25.7) | 923 (24.8) |
| University | 1376 (71.2) | 1226 (68.6) | 2630 (69.9) |
| Marital status | | | |
| Single | 439 (49.8) | 442 (50.2) | 881 (23.6) |
| Married | 1483 (52.7) | 1329 (47.3) | 2812 (75.4) |
| Widowed/divorced | 11 (0.6) | 23 (1.3) | 34 (0.9) |

# Results : Socio-demographic characteristics of respondents (n=3727)

| Economic status | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| Good | 378 (19.6) | 547 (30.5) | 925 (24.8) |
| Not good, not bad | 1084 (56.1) | 1049 (58.5) | 2153 (57.2) |
| Poor | 471 (24.4) | 198 (11.0) | 669 (17.9) |
| History of coronavirus (yes) | 18 (1.0) | 22 (1.1) | 40 (1.1) |
| History of coronavirus in a family member (yes) | 33 (1.7) | 36 (2.0) | 69 (1.9) |
| Having hypertension (yes) | 173 (8.9) | 116 (6.4) | 289 (7.7) |
| Having diabetes (yes) | | | |
| Respiratory diseases (yes) | 65 (3.3) | 45 (2.5) | 120 (3.2) |
| CVD (yes) | 78 (4.0) | 42 (2.3) | 110 (2.9) |
| Other disease (yes) | 177 (9.1) | 196 (10.8) | 373(9.9) |
| Locality | | | |
| Urban | 1862 (96.4) | 1717 (95.7) | 3579 (96.1) |
| Rural | 71 (3.6) | 77 (4.3) | 148 (3.9) |

# Results : Risk perception and psychological defense strategies by demographic characteristic

| | Response efficacy | Defensive response | | | Self-efficacy | Threats | |
|---|---|---|---|---|---|---|---|
| | | Denial | Reactance | Avoidance | | Severity | Susceptibility |
| Age (years) | Mean (SD) | Mean (Std.Er) | Mean (Std.Er) | Mean (Std.Er) | Mean (SD) | Mean (SD) | Mean (SD) |
| 15-29 | 84.0 (11.3) | 23.2 (.64) | 19.8 (.68) | 31.1 (.3) | 65.6 (17.2) | 76.4 (14.5) | 65.5 (19.6) |
| 30-44 | 83.5 (11.1) | 22.0 (.35) | 19.2 (.4) | 26.6 (.9) | 65.6 (17.2) | 77.1 (13.4) | 67.1 (17.7) |
| 45-59 | 84.2 (10.9) | 21.3 (.62) | 18.9 (.6) | 24.3 (.5) | 68.3 (16.5) | 77.0 (13.3) | 67.7 (16.8) |
| 60+ | 83.7 (11.0) | 23.0 (1.5) | 22.0 (1.5) | 24.1 (1.6) | 69.4 (16.9) | 76.0 (14.0) | 68.8 (16.3) |
| P-value | .473 | 0.134 | 0.309 | <.0001 | <.0001 | .539 | <.0001 |
| Gender | | | | | | | |
| Female | 85.0 (10.7) | 22.0 (.4) | 17.5 (.4) | 26.0 (.5) | 67.6 (17.4) | 76.9 (13.8) | 66.1 (19.1) |
| Male | 82.7 (11.3) | 22.3 (.4) | 21.1 (.4) | 28.0 (.5) | 66.4 (16.8) | 76.9 (14.1) | 69.3 (17.2) |
| P-value | .087 | .366 | 0.001 | 0.015 | 0.055 | .56 | <.0001 |
| Educational status | | | | | | | |
| Illiterate | 73.8 (13.5) | 36.4 (7.6) | 34.3 (6.2) | 34.3 (6.4) | 51.8 (21.3) | 73.7 (15.8) | 64.5 (17.6) |
| Elementary school | 81.2 (13.4) | 28.8 (3.0) | 25.8 (3.2) | 34.1 (4.5) | 68.9 (15.7) | 75.4 (15.6) | 56.9 (27.0) |
| Guidance school | 82.9 (13.1) | 28.5 (1.7) | 24.8 (1.9) | 30.8 (2.2) | 68.7 (17.9) | 74.1 (15.5) | 59.4 (18.9) |
| Secondary school | 83.5 (10.9) | 24.8 (.59) | 20.5 (.6) | 27.9 (.7) | 68.7 (16.5) | 76.0 (13.8) | 64.5 (19.1) |
| University | 84.2 (11.1) | 20.7 (.31) | 18.4 (.3) | 26.4 (.4) | 68.3 (17.2) | 77.4 (13.9) | 69.6 (17.30 |
| P-value | 0.001 | <.0001 | <.0001 | 0.01 | <.0001 | 0.004 | <.0001 |

# Results: Risk perception broken down by disease status

| | | Response efficacy Mean (SD) | Defensive response Mean (SD) | | | Self-efficacy Mean (SD) | Threats Mean (SD) | |
|---|---|---|---|---|---|---|---|---|
| | | | Denial | Reactance | Avoidance | | Severity | Susceptibility |
| History of coronavirus | Yes | 74.9 (23.5) | 32.8 (3.9) | 30.1 (4.4) | 41.5 (4.7) | 57.7 (21.9) | 67.4 (21.3) | 70.0 (22.5) |
| | No | 83.9 (10.8) | 22.0 (.27) | 19.3 (.3) | 27.0 (.4) | 67.1 (17.7) | 77.9 (13.9) | 67.7 (18.2) |
| P-value | | <0.0001 | <0.0001 | 0.009 | <0.0001 | 0.036 | 0.006 | 0.442 |
| History of coronavirus in a family member | Yes | 81.5 (18.9) | 24.5 (2.3) | 17.7 (2.5) | 30.0 (3.3) | 64.5 (20.9) | 72.9 (17.4) | 68.6 (22.1) |
| | No | 83.8 (10.8) | 22.1 (.2) | 19.4 (18.3) | 27.1 (.4) | 67.0 (17.0) | 77.0 (13.9) | 67.7 (18.1) |
| P-value | | <0.0001 | .25 | .32 | .45 | 0.018 | 0.142 | 0.031 |
| Having chronic disease | | | | | | | | |
| 0 | | 84.1 (10.8) | 21.8 (.3) | 19.3 (.7) | 27.1 (.4) | 67.5 (16.9) | 76.5 (13.9) | 69.3 (18.6) |
| 1 | | 83.1 (11.5) | 23.0 (.6) | 19.3 (.6) | 27.3 (.8) | 65.2 (17.7) | 78.4 (14.0) | 67.6 (16.7) |
| 2 | | 82.8 (11.6) | 26.1 (1.7) | 22.7 (1.9) | 27.9 (2.0) | 65.7 (16.4) | 77.2 (12.8) | 69.0 (15.7) |
| 3 and more | | 77.6 (18.3) | 21.8 (2.6) | 17.2 (2.9) | 20.0 (4.2) | 60.0 (21.3) | 74.8 (19.7) | 66.6 (22.2) |
| P-value | | 0.002 | 0.026 | 0.224 | .390 | 0.001 | 0.016 | 0.021 |

## High Perceived Efficacy Conditions, when Perceived Threat is High

- **High perceived self-efficacy** If individuals believe they can perform the recommended response (e.g., “It is easy for me to use disinfectants”.)
- **High perceived response efficacy** they believe the recommended response works in averting the threat (e.g., “If everyone in the community stays at home, the Corona cycle will be broken”.
- Their heightened perceptions of threat and efficacy motivate them to control the danger.
- When individuals control the danger, they take actions to protect themselves against it (protection motivation).
- **Key points**: *The actions taken should be recommended in the message.

*Danger control responses are usually changes in attitude, intention, and behavior in line with the message's recommendations.

# Low Perceived Efficacy Conditions, when Perceived Threat is High

❖ Low perceived self-efficacy

* If individuals doubt their ability to perform the recommended response. OR

*They doubt whether the recommended response really averts the threat.

❖Defensive motivation

*They believe there's no use in controlling the danger.

*They turn their attention instead to controlling their fear.

❖When defensive avoidance occurs, individuals distort or ignore incoming information about a threat.

# Discriminate value

- calculating danger control or fear control score

(Σ Perceived Efficacy)
– (Σ Perceived Threat)
= Discriminating Value (discriminates between fear control and danger control)

- Your discriminating value is either a positive or negative number.
- A positive value means that your audience is engaging in danger control processes because perceptions of efficacy are stronger than perceptions of threat.
- A negative value means your client or target audience is engaging in fear control processes because perceptions of threat are stronger than perceptions of efficacy.

# Fear control and danger control

- your audience are likely to be engaging in fear control processes and are probably not protecting themselves against the specified health threat.

# Results: Behavioral responses, overall perceived fear and tension, and danger and fear control

| | Behavioral responses | Overall fear | Overall tension | Danger control | Fear control |
|---|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | Mean (SD) | N (%) | N (%) |
| **Total** | 6.0 (0.98) | 6.5 (2.9) | 6.8 (2.9) | 2101 (56.4) | 1626 (43.6) |
| **Age** | | | | | |
| **15-29** | 5.7 (1.1) | 6.35 (3.0) | 6.7 (2.9) | 531 (61.4) | 334 (38.6) |
| **30-44** | 6.1 (.9) | 6.7 (2.9) | 7.0 (2.8) | 1061 (53.2) | 934 (46.8) |
| **45-59** | 6.1 (.8) | 6.2 (2.9) | 6.5 (2.9) | 434 (59.1) | 300 (40.9) |
| **60+** | 5.9 (1.0) | 5.8 (2.9) | 6.2 (2.8) | 75 (56.4) | 58 (43.6) |
| **P-value** | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |

# Results: Behavioral responses, overall perceived fear and tension, and danger and fear control

| | Behavioral responses | Overall fear | Overall tension | Danger control | Fear control |
|---|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | Mean (SD) | N (%) | N (%) |
| Gender | | | | | |
| Female | 5.9 (0.94) | 6.7 (3.0) | 7.1 (2.8) | 1079 (60.1) | 715 (39.9) |
| Male | 6.1 (1.0) | 6.3 (2.9) | 6.6 (2.9) | 1022 (52.9) | 911 (47.1) |
| | 0.005 | 0.315 | 0.677 | <0.0001 | |
| Educational status | | | | | |
| Illiterate | 5.25 (1.7) | 7.1 (3.1) | 7.3 (2.) | 6 (37.5) | 10 (62.5%) |
| Elementary school | 5.8 (1.1) | 6.7 (3.50 | 6.4 (3f.5) | 33 (68.8) | 15 (31.3) |
| Guidance school | 5.9 (1.1) | 6.4 (3.1) | 6.8 (3.0) | 35 (25.4) | 103 (74.9) |
| Secondary school | 6.0 (1.0) | 6.5 (3.1) | 6.8 (3.1) | 595 (64.5) | 328 (35.5) |
| University | 6.0 (.9) | 6.4 (2.9) | 6.8 (2.8) | 1364 (52.4) | 1238 (47.6) |
| P-value | .003 | .844 | .715 | <0.0001 | |
| Marital status | | | | | |
| Single | 5.7 (1.1) | 6.2 (2.9) | 6.5 (2.9) | 519 (58.9) | 362 (41.1) |
| Married | 6.1 (.9) | 6.6 (2.9) | 6.9 (2.8) | 1566 (55.7) | 1246 (44.3) |
| Widowed/Divorced | 5.5 (1.3) | 5.6 (3.3) | 5.9 (3.2) | 16 (47.1) | 18 (52.9) |
| P-value | <0.0001 | 0.001 | <0.0001 | 0.133 | |

# Results: Behavioral responses, overall perceived fear and tension, and danger and fear control

| | Behavioral responses | Overall fear | Overall tension | Danger control | Fear control |
|---|---|---|---|---|---|
| History of coronavirus in a family member | Mean (SD) | Mean (SD) | Mean (SD) | n (%) | n (%) |
| Yes | 5.7 (1.6) | 6.1 (3.0) | 6.6 (2.9) | 34 (49.6) | 35 (50.7) |
| No | 6.0 (.9) | 6.5 (2.9) | 6.8 (2.8) | 2067 (56.5) | 1591 (43.5) |
| P-value | <.0.0001 | .713 | .688 | 0.141 | |
| Disease status | | | | | |
| 0 | 6.0 (.97) | 6.4 (2.9) | 6.7 (2.9) | 1677 (58.2) | 1202 (41.8) |
| 1 | 6.0 (.96) | 6.7 (3.0) | 7.1 (2.8) | 346 (49.2) | 357 (50.8) |
| 2 | 6.0 (1.1) | 6.7 (2.9) | 7.0 (2.8) | 66 (57.4) | 49 (42.6) |
| 3 and more | 5.7 (1.8) | 7.2 (2.8) | 7.5 (2.9) | 12 (40) | 18 (60.0) |
| P-value | .941 | .049 | .028 | <0.0001 | |
| Locality | | | | | |
| Urban | 6.0 (.99) | 6.5 (2.9) | 6.8 (2.8) | 2014 (56.3) | 1565 (43.7) |
| Rural | 6.2 (.9) | 3.2 | 6.5 (3.0) | 87 (58.8) | 61 (41.2) |
| P-value | .46 | .05 | .134 | 0.555 | |

## Main points and conclusion

- Our results show that 56.4% of respondents were motivated by **danger control** responses and 43.6% by fear control responses.
- This indicates that more than half of all participants had high perceived efficacy (i.e., self-efficacy and response efficacy) scores.
- **Self-efficacy** scores were significantly higher among participants who were older, female, single, lived in rural areas, or had good economic status.
- Lower self-efficacy: *people with a history of coronavirus

*Respondents who had a family member with coronavirus

*those with three or more comorbidities.

# Main points and conclusion

- Overall stress and tension levels also indicated that stress and tension were significantly lower among respondents who were older, had no diseases, lived in rural areas, were widowed/divorced, or had good economic status.
- Efficacy responses were significantly higher among respondents who were well-educated and had good economic status.

# *Strengths and limitations*

- the online method allows for the timely gathering of information from a wide range of community groups.
- Since the pandemic made other data collection methods were unsafe and difficult for both the researchers and the study participants, the online sampling method was particularly convenient.
- We asked participants to complete the questionnaire for any family members who were illiterate or had no internet access.
- Another strength is that this study is the first to record the behavioral responses of people to early information about COVID-19, before they later became saturated with COVID-19 news and information.


THE END
THANK YOU!