



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



An explorative study of the individual differences associated with consumer stockpiling during the early stages of the 2020 Coronavirus outbreak in Europe

Jesper Dammeyer*

Department of Psychology, University of Copenhagen, Denmark

ARTICLE INFO

Keywords:

Covid-19
Coronavirus
Health literacy
Hoarding
Panic buying
Personality traits
Social dominance orientation
Stockpiling

ABSTRACT

There is little existing research on why some people stockpile goods and others do not at a time of crisis. More research on this phenomenon and the individual differences associated with it is needed in order to gain a better understanding of what is a potentially economically and socially disruptive behavior. In this study, 175 adult participants from Denmark and 90 from the United Kingdom responded to a survey about the activity of extra shopping (stockpiling) during the first weeks of the Coronavirus outbreak. Questions exploring the “big five” personality traits, Social Dominance Orientation, Health Literacy, and attitudes to the governmental response to the crisis were included in the survey. The explorative analysis showed that stockpiling was associated with high scores on Extraversion and Neuroticism, and low scores on Conscientiousness and Openness to Experience. Stockpiling was also associated with the view that the government should be doing more to stop the Coronavirus epidemic. An explorative factor analysis of reasons for stockpiling identified the two factors “Panic” and “Action”.

1. Introduction

During the early stages of the 2020 Coronavirus pandemic in Europe, many countries experienced the phenomenon of consumer stockpiling of goods including food, cleaning and hygiene products, and medicines. This was reported in Denmark (Weirsøe, 2020) and the United Kingdom (Barr, 2020), the research contexts of this study. Such stockpiling of goods is potentially economically and socially disruptive, risking increased prices and scarcity of goods, with particular consequences for vulnerable groups such as the elderly. The objective of this study was to explore the psychological factors that might explain stockpiling.

Although stockpiling seems to be a common phenomenon in many countries at a time of crisis, there are only a few published studies on the topic and individual differences. Sterman and Dogan (2015) used the “Beer Distribution Game” to study stockpiling (referred to as “hoarding” and “phantom ordering”). In the game, stockpiling was an objectively irrational gaming behavior, as there were no mechanisms of capacity constraint, competition, or randomness. Nevertheless, they found stockpiling behavior among 22% of the participants. Hori and Iwamoto (2014) analyzed consumer data on “panic buying” in Tokyo following the 2011 Tohoku earthquake. Of relevance for this study,

they investigated the characteristics of the households that engaged in panic buying. They found that households with large number of family members, households in urban areas, and households comprising a middle-aged or older full-time homemaker wife were likely to engage in panic buying.

One might think that compulsive buying or hoarding disorder might be related to stockpiling. However, whereas compulsive buying and hoarding are associated with depressive and anxiety disorders and impulse control difficulties (Frost et al., 2015), stockpiling seems to be different. In a qualitative study, Kulemeka (2010) explored consumer habits before and during the hurricane season. It was observed that shoppers who engaged in hoarding and panic buying at this time did not show this behavior in the pre-hurricane season, when they were more organized and willing to assist others.

Few studies to date have investigated if individual differences explain why some people stockpile and others do not. One can hypothesize that, further to differences of age, gender, and educational level, some of the “big five” personality traits are linked to the tendency to stockpile at a time of crisis. People with high scores on Neuroticism might be more likely to stockpile because of a stronger response to, and lower ability to cope with, a crisis situation. Further, people who are low on Agreeableness might have a stronger tendency to stockpile

* University of Copenhagen, Department of Psychology, Øster Farimagsgade 2a, 1353 Copenhagen K, Denmark
E-mail address: Jesper.dammeyer@psy.ku.dk.

<https://doi.org/10.1016/j.paid.2020.110263>

Received 29 April 2020; Received in revised form 9 July 2020; Accepted 13 July 2020

Available online 22 July 2020

0191-8869/ © 2020 Elsevier Ltd. All rights reserved.

because of a heightened focus on their own needs rather than on a more co-operative and altruistic concern for others. It can be further hypothesized that people who are high on Conscientiousness might stockpile in order to be well-prepared for the difficult situation to come. Another individual difference of interest is Social Dominance Orientation (SDO), which concerns attitudes towards hierarchical group relations and the desire to ensure that one's own group is dominant (Pratto et al., 1994). SDO can be seen on a continuum from high (endorsing hierarchy-enhancing ideologies, such as racism) to low (endorsing hierarchy-attenuating ideologies, such as anarchism) (e.g. Perry et al., 2013). SDO has mostly been researched in association with right-wing authoritarianism, political orientation, and prejudice (Perry et al., 2013), but it can also be hypothesized that a high SDO score is associated with a tendency to protect one's social group and therefore to stockpile in a time of crisis.

Health Literacy is another factor of interest. This concerns an individual's health-related knowledge and motivation, and their competences to access, understand, appraise, and apply health information in order to make the best judgments and decisions concerning health (Sørensen et al., 2012). Thus, Health Literacy is not only about knowledge but also about the emotional resources for motivating health relevant behavior and decisions. Health Literacy might help explain people's stockpiling behavior and it is hypothesized that low levels of Health Literacy are linked to stockpiling. People with low levels of Health Literacy are likely to find it more difficult to process health-related information and instructions conveyed through various media to stay home and not stockpile.

1.1. Study aim

It is known that, at times of crisis, some people stockpile consumer goods while others do not. The very limited research-based knowledge about the possible psychological factors involved calls for an explorative study on individual differences that might help explain the phenomenon. This study looks not only at gender, age, and educational level but also at personality traits, social dominance orientation, health literacy, attitudes to the government response, attitudes to stockpiling, and reasons for stockpiling.

2. Method

2.1. Participants and data collection

Data were collected in the weeks just following the respective announcements by the Danish and British governments of country-wide lockdowns due to the Coronavirus outbreak and when most of the stockpiling or panic buying was reported. For the Danish sample, the data collection period was 19th of March to 2th of April 2020, and, for the British sample, the data collection period was 26th of March to 4th

of April 2020. Social media forums including Facebook and LinkedIn groups were used for data collection to generate sufficient responses in a relatively short timeframe.

The invitation text invited people to participate in a research survey on behavioral responses to the Coronavirus crisis. Participants gave their informed consent to participate on the first page of the survey. No compensation was offered.

The total number of responses was 204 for the Danish survey and 97 for the United Kingdom survey. Participants who did not respond to the question on stockpiling were excluded, resulting in a Danish sample of 175 and a United Kingdom sample of 90. See sample characteristics in Table 2.

2.2. Questionnaire

2.2.1. Background characteristics

Next to gender, age, and level of educational attainment, participants were asked if they were living alone or with one person or more (see Table 2 for details).

2.2.2. Stockpiling

Participants were asked: "How much extra shopping (e.g. for food, medicine, lavatory paper etc.) have you done in connection with the on-going Coronavirus outbreak?". Response categories were: A lot (1); Some (2); A little (3); None at all (4). A further question asked about attitudes towards extra shopping: "Do you think it is ok for people to do extra shopping (e.g. for food, medicine, etc.) in connection with the on-going Coronavirus outbreak?" Possible responses were: Yes, it is ok (1); A little extra is ok/it is ok for people with special needs (2); No, it is not ok (3).

2.2.3. Reasons for stockpiling

In preparation for the survey question on reasons for stockpiling, 7 people were individually interviewed. The interviewees were all Danish and recruited from a student cohort. They were asked: "Please mention all the different reasons you can come up with that people may buy extra or stockpile in a crisis situation? Think about yourselves and different people you know". The responses from the interviews were amalgamated, resulting in 10 different statements of reasons that were all included in the survey (see the reasons in Table 1). The survey participants who reported stockpiling were asked to respond to the 10 reasons on a Likert scale from "strongly agree" (1) to "strongly disagree" (5). An explorative factor-analysis (Fabrigar et al., 1999) was performed on the responses, which showed 2 factors (eigenvalues > 1.0). A 3 factor solution was also tested but did not show a simple structure or explain much more of the data variance (an additional 10.4%). Varimax rotation was used as factors were uncorrelated (Fabrigar et al., 1999). The two factors were labeled "Panic" and "Action" based on content (see Table 1 for details). The item "I was afraid

Table 1
Explorative factor analysis of reasons to shop extra.

Question	Factor 1 Panic	Factor 2 Action
I wanted to be sure that I and my family have enough food, medicine, etc. I knew that other people were doing it.	0.690	0.118
I wanted to share the experience with my family and friends.	0.544	0.199
It felt good to be able to do something active in a crisis situation.	0.128	0.669
I'm the sort of person who always has enough of everything.	0.141	0.756
My family or I have always done this sort of thing in situations like this.	0.202	0.587
I did not want to risk being the only one who ran out of food, medicine, etc.	0.250	0.640
I did not feel confident that the authorities and the stores could provide enough goods.	0.733	0.210
I was afraid that suddenly there would not be enough food, medicine etc.	0.812	0.002
It is kind of fun to go shopping when things feel a little dramatic.	0.871	0.012
	0.221	0.645

Note: Principal Component Analysis, Varimax Rotation with Kaiser Normalization. Rotation Sums of Squared Loadings Factor 1: 2.915, 29.2% of variance. Factor 2: 2.286, 22.9% of variance; Cronbach's Alpha Factor 1: 0.800. Factor 2: 0.702. Bold indicate high loading.

that suddenly there would not be enough food, medicine etc.” had the highest loading for Panic (0.871), and “It felt good to be able to do something active in a crisis situation” had the highest loading for Action (0.756). For further analysis in this study, sum scores of Panic and Action reasons for stockpiling were calculated. Range 2–25 and low scores indicate agreement with the reason for stockpiling.

2.2.4. Personality traits

The BFI-10 was used to measure the “big five” personality traits of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. The BFI-10 has shown to have acceptable psychometric properties (Rammstedt & John, 2007). Each trait is measured with two items, one reversely scored, on a 5-point Likert scale. Scoring for each item is the average of the reserved scored and normal scored item, resulting in a score between 1 and 5.

2.2.5. Social dominance orientation

The SDO_{7(s)} measures, through 8 items, an individual's attitudes towards social dominance (SDO-D) and anti-elitism (SDO-E). Each item is rated on a Likert scale from “strongly oppose” (1) to “strongly favor” (7) (Ho et al., 2015). Four items tap into each subscale, two normal scored and two reversed scored. SDO-D, SDO-E, and SDO total scores were used in the analyses.

2.2.6. Health Literacy

The HLS-Q16 was used to measure Health Literacy (Pelikan & Ganahl, 2017). The 16 items are rated on a scale from very difficult (1) to very easy (4). A sample item is: “...decide how you can protect yourself from illness based on information in the media?” A simple sum score is calculated and high scores indicate a high level of Health Literacy.

2.2.7. Attitudes to the Coronavirus situation

Participants were asked: “What do you think of the government's actions (e.g. closing down pubs) to stop the spread of Coronavirus?” Responses ranged from “much more is needed” (1) to “it is far too much” (5). “How serious do you think the Coronavirus outbreak is for Danish/UK society as a whole?” Responses ranged from “extremely serious” (1) to “not serious” (4). A final question was: “Do you have confidence in how the government and authorities are managing the Coronavirus outbreak?” Response categories were on a scale from “yes I have full confidence” (1) to “no, I do not have confidence at all” (5). All questions were proposed by the author.

2.3. Analytic strategy

Firstly, a descriptive analysis of frequency of stockpiling, reasons for stockpiling, and attitudes towards stockpiling were reported for each of the two countries. Secondly, pairwise correlations between stockpiling and the individual differences and attitudes measures were analyzed.

3. Results

For all participants (Danish and British), four out of ten (39.2%) reported that they had not done extra shopping during the Coronavirus outbreak crisis (see Table 2 for details). Another four out of ten reported that they had shopped a little extra (38.1%), two out of ten (21.1%) reported doing some extra shopping, and 1.5% reported that they done a lot of extra shopping. More of the British participants reported extra shopping; 16.7% reported no extra shopping, whereas the figure for the Danish participants was 50.9%. For the total sample, about two out of ten (18.6%) reported that it is “not ok” for people to do extra shopping. Again, the figures were different for the two countries: 23.2% of the Danish sample compared to 10% of the British sample reported that it was “not ok” to do extra shopping.

Table 3 shows associations between individual differences and

Table 2
Descriptive data on stockpiling during the Coronavirus outbreak in Denmark and United Kingdom.

	Denmark (N = 175)	United Kingdom (N = 90)	All (N = 265)
Females n(%)	128(74.9)	80(89.9)	208(80.0)
Age M(SD)	42.3(17.2)	47.8(9.5)	44.2(15.2)
Higher education n(%)	59(32.0)	51(22.2)	110(41.5)
Live alone n(%)	42(24.0)	4(4.5)	46(17.4)
How much shopped extra? n(%)			
A lot	1(0.6)	3(3.3)	4(1.5)
Some	18(10.3)	38(42.2)	56(21.1)
Little	67(38.3)	34(37.8)	101(38.1)
None at all	89(50.9)	15(16.7)	104(39.2)
Ok that people do extra shopping? n (%)			
Yes	10(6.0)	5(5.6)	15(5.8)
A little	119(70.8)	76(84.4)	195(75.6)
No	39(23.2)	9(10.0)	48(18.6)
Reasons to shop extra M(SD)			
Panic (range 5–25)	16.9(4.38)	13.2(4.15)	15.1(4.65)
Action (range 5–25)			
Attitudes M(SD)	17.4(4.17)	18.5(3.62)	18.0(3.93)
Are government's actions appropriate (1 = much more is needed, 3 = appropriate, 5 = it's fare too much)	2.86(0.55)	2.13(0.94)	2.61(0.78)
How serious is the crisis (1 = extremely serious, 4 not serious)	1.41(0.57)	1.16(0.39)	1.32(0.53)
Confidence in government's actions (1 = full confidence, 5 = no confidence)	1.51(0.63)	2.7(1.07)	1.92(0.98)

Table 3
Correlations between buying extra variables and individual differences for all participants (Danish plus British, N = 265).

	Buy extra	Ok to buy extra	Panic	Action
Gender (1 = female, 2 = male)	-0.038	-0.062	-0.015	0.177*
Age	0.026	0.054	-0.106	-0.012
Level of education (1 = low)	-0.039	-0.021	-0.183**	0.014
Living arrangement (1 = alone, 2 = with one other, 3 = with more than one other)	-0.052	-0.092	-0.120	-0.040
Personality traits				
Extroversion	-0.150**	-0.011	-0.217**	-0.007
Agreeableness	0.093	0.032	0.078	0.026
Conscientiousness	0.117*	0.022	-0.055	0.055
Neuroticism	-0.163**	-0.122*	-0.149*	-0.058
Openness to experience	0.191**	0.017	0.174**	-0.034
Social Dominance Orientation				
SDO-D	-0.034	-0.010	-0.072	-0.115
SDO-E	0.057	-0.022	-0.039	-0.176**
SDO total	0.009	-0.015	-0.057	-0.165*
Health Literacy	0.107	-0.028	0.070	0.146*

Note: Kendall's tau-b correlations.

* p < .05.

** p < .01.

doing extra shopping. A gender difference was found for Action reasons for extra shopping, with women more likely to give this reasoning than men. No significant associations were found for age or living alone or with one person or more. High levels of educational attainment were associated with Panic reasons for extra shopping. It should be noted here again that only those who reported doing extra shopping responded to the further questions on the reasons.

Table 4
Correlations between buying extra variables and attitudes to the Coronavirus situation for Danish sample (N = 175) and British sample (N = 90), respectively.

	Denmark				United Kingdom				All			
	Buy extra	Ok to buy extra	Panic	Active	Buy extra	Ok to buy extra	Panic	Active	Buy extra	Ok to buy extra	Panic	Active
Are government's actions appropriate	0.167*	0.060	0.079	-0.041	0.035	-0.071	0.140	0.061	0.223**	0.067	0.176**	-0.016
How serious is the crisis	0.005	0.094	0.133	-0.151	0.042	0.030	-0.083	-0.211	0.098	0.108	0.130	-0.183*
Confidence in government's actions	0.033	-0.138	-0.068	-0.131	-0.110	0.101	-0.301**	0.006	-0.222**	-0.132*	-0.318**	0.018

Note: Kendall's tau-b correlations.

* p < .05.
** p < .01.

For the personality traits (Table 3), high scores on Extraversion were associated with extra shopping and Panic reasons for extra shopping. For Agreeableness, no significant associations were observed. Low scores on Conscientiousness were associated with extra shopping. High scores on Neuroticism were associated with extra shopping, believing that it is ok for people to do extra shopping, and Panic reasons for extra shopping. Low scores on Openness to Experience were associated with extra shopping and Panic reasons for extra shopping.

Table 3 also shows associations between Social Dominance Orientation and extra shopping. Significant associations were found, with high scores on SDO-E and high total SDO scores associated with Action reasons for extra shopping. Finally, a low score on Health Literacy was associated with Action reasons for extra shopping.

Table 4 shows correlations between extra shopping and attitudes to the Coronavirus outbreak situation. For the Danish sample and the total sample, a significant association was found between doing extra shopping and believing that the government's actions to stop the spread of Coronavirus were too little. Further, believing that the government's actions were too little was associated with Panic reasons for extra shopping. One significant association was observed for participants' rating of how serious the Coronavirus crisis was. For the total sample, the more seriously the crisis was rated, the more likely was the participant to give Action reasons for extra shopping. Significant associations were found regarding the participants' confidence in the government's management of the Coronavirus outbreak. For the total sample, the less confident the participants were, the more likely they were to do extra shopping, believe that it is ok to do so, and give Panic reasons for doing so. For the British sample, there was also a significant association between low confidence in the government's management and Panic reasons for extra shopping.

4. Discussion

This study's findings should be interpreted through consideration of its limitations. These limitations are a small sample size and the overrepresentation of women and people with higher education. While participants were assured of anonymity, social desirability bias cannot be ruled out with respect to the questions on doing extra shopping at a time of crisis. However, one of the strengths of this study is that the data were collected during the crisis, thereby minimizing the risk of recall bias. Despite the limitations and preliminary nature of this study, it is the first one of its kind and gives novel insight into who was stockpiling and why at an extraordinary time of crisis.

No significant associations were found between stockpiling and gender, age, level of education, and type of living arrangement. This contrasts with Hori and Iwamoto's (2014) study in Tokyo which found that households with a middle-aged or older full-time homemaker wife and households with a large number of family members were more likely to engage in panic buying. The difference between the socio-cultural context of the present study and that of the Hori and Iwamoto's

(2014) study might explain this, as domestic gender roles might be less traditional in a North European context in 2020 than in Japan in 2014.

The findings for personality traits were partly as hypothesized. Those with high scores on Neuroticism reported more extra shopping than people with low scores on Neuroticism. This is not a surprising finding, as it is well established that people high on Neuroticism are more reactive, overreact to stressors, and have more difficulties coping with stressful situations (Mroczek & Almeida, 2004). One example from existing research regards smoking, where high scores on Neuroticism are found to be associated with persistent smoking and a progressive smoking trajectory (Zvolensky et al., 2016). In this study, a high score on Neuroticism was also associated with more positive attitudes towards extra shopping during the Coronavirus outbreak.

A high score on Openness to Experience was associated with lower levels of extra shopping. Explanations might be found in previous research showing that people with high scores on Openness to Experience have been found to exhibit greater flexibility in dealing with life changes and reflecting on current events (Whitbourne, 1986). Being flexible and open to reasonable alterations in life conditions (Tesch & Cameron, 2003) might check people with high scores on Openness to Experience from engaging in stockpiling. High scores on Conscientiousness were also associated with a lower tendency to engage in extra shopping. This was counter to the hypothesis that people high on Conscientiousness might stockpile in order to be well-prepared for the crisis. From the findings here, it might be alternatively posited that people high on Conscientiousness are checked from stockpiling because of their typical tendencies of being disciplined, organized, and responsible. In line with this, people low on Conscientiousness might be more likely to misjudge situations, engage in impulsive behavior, and break rules. However, it should be noted that this study was not able to analyze separately for those with extremes scores but could only analyze the correlations with the full score. Therefore, it cannot be ruled out that those with very high scores on Conscientiousness might demonstrate a different association with the tendency to stockpile. It was not hypothesized that high scores on Extraversion would be associated with extra shopping. That people high on extraversion are more social and also more excitement-seeking might explain this association. However, this is not supported by the finding that those high on Extraversion also reported Panic reasons for extra shopping. More research is needed on both the different facets of personality traits and the combination of traits. In order to do so, future research should include thorough measures on personality traits. Finally, it was hypothesized that Agreeableness would be associated with extra shopping, but this could not be confirmed in this study. Further research could investigate if stockpiling is more specifically linked to the degree to which people are altruistic or modest, these being two facets of Agreeableness.

A novel finding from this study concerns the two reasons for extra shopping that were based on an explorative factor analysis of reasons identified in qualitative interviews. For some people, doing extra shopping appears to be related to social activity and doing something

active, whereas for others, it appears to be linked to reasons of panic and worry. The Panic reasons here were associated with high scores on Extraversion and Neuroticism and low scores on Openness to Experience. As discussed above, the links with Neuroticism and Openness to Experience are not surprising, but it is less clear why high scores on Extraversion are linked to Panic reasons. The Action reason for extra shopping was not associated with any of the personality traits, but it was associated with being female, high scores on SDO-E and SDO-total, and a low score on Health Literacy. That people endorsing antiegalitarian (high scores SDO-E) and social dominance (high total SDO scores) views also endorsed Action reasons might be explained by previous research showing that a high SDO score is negatively correlated with empathy, tolerance, communality, and altruism (Pratto et al., 1994).

Several of the attitudes to the Coronavirus situation, encompassing government actions, seriousness of the crisis, and confidence in the government, were associated with the extra shopping variables. This is not surprising and underlines the significance of society-wide factors. This study's findings also indicated differences in mean level scores for attitudes between Denmark and the United Kingdom, the British sample reported overall lower levels of trust compared to the Danish sample. However, due to the convenience sampling method used, no conclusions should be drawn. More research is needed to explore individual differences and how they are potentially linked with and moderate attitudes to governments and authorities in different countries and at different stages of a crisis situation.

4.1. Conclusion

The study found that individual differences were significant in explaining stockpiling, attitudes towards stockpiling, and reasons for stockpiling. Stockpiling was associated with high scores on Extraversion and Neuroticism, and low scores on Conscientiousness and Openness to Experience. Stockpiling was also associated with the view that the government should be doing more to stop the Coronavirus epidemic. The study also identified the two composite reasons of Panic and Action as explanatory factors for engaging in stockpiling. It found that gender, Social Dominance Orientation, and Health Literacy were related to Action reasons for stockpiling, while level of education, Extraversion, and Openness to Experience were associated with Panic reasons for stockpiling. Despite the limitations and the preliminary nature of this study, it gives a first look into the individual differences that might explain stockpiling behavior at a time of crisis.

No funding and no conflict of interest to report.

CRedit authorship contribution statement

Jesper Dammeyer: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration,

Resources, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing.

References

- Barr, S. (2020). Coronavirus panic-buying: As supermarkets rationalize items, should customers be stockpiling? Retrieved from The Independent <https://www.independent.co.uk/life-style/food-and-drink/coronavirus-stockpile-emergency-list-food-hand-sanitiser-panic-buying-a9373061.html>.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272–299. <https://doi.org/10.1037/1082-989X.4.3.272>.
- Frost, R. O., Steketee, G., & Tolin, D. F. (2015). Comorbidity in hoarding disorder. *Fokus*, 13(2), 244–251. <https://doi.org/10.1176/appi.focus.130218>.
- Ho, A. K., Sidanius, J., Kteily, N., Sheehy-Skeffington, J., Pratto, F., Henkel, K. E., & Stewart, A. L. (2015). The nature of social dominance orientation: Theorizing and measuring preferences for intergroup inequality using the new SDO7 scale. *Journal of Personality and Social Psychology*, 109, 1003–1028. <https://doi.org/10.1037/psp0000033>.
- Hori, M., & Iwamoto, K. (2014). The run on daily foods and goods after the 2011 Tohoku earthquake. *The Japanese Political Economy*, 40(1), 69–113. <https://doi.org/10.2753/JES2329-194X400103>.
- Kulemeka, O. (2010). Us consumers and disaster: Observing “panic buying” during the winter storm and hurricane seasons. In M. C. Campbell, J. Inman, & R. Pieters (Vol. Eds.), *Advances in consumer research*. Vol. Volume 37. *Advances in consumer research* (pp. 837–838). Duluth, MN: Association for Consumer Research.
- Mroczek, D. K., & Almeida, D. M. (2004). The effects of daily stress, age, and personality on daily negative affect. *Journal of Personality*, 72, 354–378. <https://doi.org/10.1111/j.0022-3506.2004.00265.x>.
- Pelikan, J. M., & Ganahl, K. (2017). Measuring health literacy in general populations: Primary findings from the HLS-EU Consortium's health literacy assessment effort. In R. A. Logan, & E. R. Siegel (Vol. Eds.), *Health literacy: New directions in research, theory and practice*. vol. 240. *Health literacy: New directions in research, theory and practice* (pp. 34–59). Amsterdam, Berlin and Washington, DC: IOS Press.
- Perry, R., Sibley, C. G., & Duckitt, J. (2013). Dangerous and competitive worldviews: A meta-analysis of their associations with Social Dominance Orientation and Right-Wing Authoritarianism. *Journal of Research in Personality*, 47, 116–127. <https://doi.org/10.1016/j.jrp.2012.10.004>.
- Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, 67, 741–763. <https://doi.org/10.1037/0022-3514.67.4.741>.
- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1), 203–212. <https://doi.org/10.1016/j.jrp.2006.02.001>.
- Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J. M., Stońska, Z. A., et al. (2012). Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, 12, 80.
- Sterman, J. D., & Dogan, G. (2015). “I’m not hoarding, I’m just stocking up before the hoarders get here.” Behavioral causes of phantom ordering in supply chains. *Journal of Operations Management*, 39–40, 6–22.
- Tesch, S. A., & Cameron, K. A. (2003). Openness to experience and development of adult identity. *Journal of Personality*, 55(4), 615–630.
- Weirsoe, F. (2020). Hamstring i Netto: Kunder i slagsmål om varer. [Panic Buying in Netto: Customers fight about goods.] Tv2 Fyn. Retrieved from <https://www.tv2fyn.dk/odense/hamstring-ung-mand-anholdt-efter-corona-slagsmaal-i-netto>.
- Whitbourne, S. K. (1986). Openness to experience, identity flexibility, and life change in adults. *Journal of Personality and Social Psychology*, 50(1), 163–168.
- Zvolensky, M. J., Taha, F., Bono, A., & Goodwin, R. D. (2016). Big five personality factors and cigarette smoking: A 10-year study among US adults. *Journal of Psychiatric Research*, 63, 91–96. <https://doi.org/10.1016/j.jpsychires.2015.02.008>.