### Can the Theory of Planned Behavior, predict possible differences in physical activity involvement during COVID-19 lockdown? A preliminary study

TPB, Physical Activity and COVID-19

**ABSTRACT**

According to the World Health Organization (WHO), the spread of the COVID-19 pandemic raises concerns about increased panic and growing anxiety in people trapped in either a real or theoretical threat of SARS-CoV-2. This preliminary study aimed to investigate the contribution of the Theory of Planned Behavior to the prediction of attitudes and intention of adult involvement with physical activity during the Pandemic. The sample consisted of 904 individuals, 417 men, and 487 women, aged 18-70 years. Participants completed the Greek version of the "Theory of Planned Behavior" questionnaire. The analyses revealed differences between previous and during COVID-19 physical involvement in (a) attitudes, (b) intention, (c) attitude strength, (d) self-identity, and (e) subjective norms, of the sample. Physical activity is an area that can strengthen the psyche of individuals. In contrast to the general trend of the COVID-19 era, our findings showed that people even in difficult situations, which are representative of a pandemic crisis, tend to seek the best possible use of the possibilities which are available to them. One of them is physical activity, which they took full advantage of during the quarantine period.

Keywords: Pandemic, attitudes, intention, physical activity.

**INTRODUCTION**

Almost a year now since December 2019, the whole world faces a coronavirus disease, known as SARS-CoV-2 (Lee, 2020). It broke out in Chine, but the spread of the deadly virus is global. Global disease control constitutes a major challenge. Political decisions must be taken by governments and local authorities, balancing between protection of population survival and defending civil rights and public health (Lee & Morling, 2020). More specifically, the measures target to reduce infection rate, prevent overloading the healthcare system, and save humans life after all, by the cost of mental and social problems increase, because of quarantine and isolation (Ansari & Yousefabad, 2020; Lee, & Morling, 2020).

An area that is equally affected by the new social data of the pandemic is physical activity (Maltagliati, 2020). By the term physical activity, it is mended any movement caused by the voluntary movement of the muscles of the body, resulting in the production of energy at a level above that produced at rest. From that point of view, the definition of physical activity includes engaging in a sport, occupation with regular exercise, but also occasional activities or hobbies (Cavill, Kahlmeier, & Racioppi, 2006; Bouchard, Blair, & Haskell, 2007). Therefore, it is easy to understand that physical activity is a state with a wide range of applications. In essence, physical activity is one of the basic functions of an individual (Cavill, Kahlmeier, & Racioppi, 2006).

Researches over the last 15 years have shown that physical activity brings significant benefits, in both physical and psychological diseases. More specifically, it has been found that people who exercise have half the incidence of a cardiovascular event than people who do not follow a fitness program. Also, people who have integrated exercise into their daily routine have 30% lower rates of obesity. Physical activity can play an important role in reducing mental illness incidence, as depression and suicide, and be a shield against mental illnesses, such as stress (Cavill, Kahlmeier & Racioppi, 2006; Bouchard, Blair & Haskell, 2007; Biddle & Mutrie, 2008).

Participation in Physical Activity can be considered as a “type of behavior”, which needs to be investigated and examined the factors that determine it. Many factors can play an important role in predicting certain behaviors (attitudes and intentions). One theory that can provide answers to such problematic behaviors is the “Theory of Planned Behavior” (Ajzen, 2012). According to the theory, what immediately precedes any behavior is the “Intention” of the individual to act.

The possibility of performing a behavior is called “behavioral intention”. The stronger the person's intention, the more likely he is to try to behave according to his intention (Ajzen & Fishbein, 1980). The attitude towards the behavior indicates the predisposition of the person for favorable or unfavorable engagement. Also, according to theory (Ajzen, 2012), the execution of behavior is not only related to the intention of the individual. A behavior can be completely controlled by the individual, i.e. it depends on him whether he decides to execute it or not. Regardless of the person's intention to perform a behavior, there are usually obstacles that can cause problems. Such obstacles are internal factors such as skills, abilities, knowledge, planning, and external factors such as time, opportunities, information, e.t.c. (Ajzen & Madden, 1986). Behavior control is between two extremes: at one end is completely controlled behavior, and at the other end is completely uncontrollable behavior (Ajzen, 2012).

Subsequent related research (Theodorakis, 1994; Theodorakis, Doganis, Bagiatis, & Goudas, 1991) examined some additional factors related to behavioral prediction. These two new factors influence a person's intention for this behavior. More specifically, these factors are the “Attitude Strength” and the “Self-Identity”. “Attitude Strength” refers to the confidence that the person feels about the specific behavior, how correct the view is to act in this way, the importance he feels in terms of his intention, and whether knowledge, information, and interest play an important role in shaping the intention. “Self-Identity”, in turn, focuses on how capable he believes each person is to follow the new behavior. And self-identity affects the intention of the individual but is affected by the strength of his attitudes.

Benefits of exercise are already known in the literature (Cavill, Kahlmeier, & Racioppi, 2006; Bouchard, Blair & Haskell, 2007; Biddle & Mutrie, 2008). At this crucial period, with COVID-19 to be a vivid part of human life and the knowledge of the importunacy of physical activity in humans’ health, the question if people physical activity behavior is affected by coronavirus and lockdown, is an important research issue. Although researches are showing that people have changed their behavior regarding physical activity during COVID-19 lockdown with most of them decreased their engagement in physical activity and some of them increased it (Cheval et al., 2020; Constandt et al., 2020; Deschasaux-Tanguy et al., 2020; Gallè et al., 2020; Sañudo et al., 2020; Goethals, Barth, Guyot, Hupin, Celarier, & Bongue, 2020; Frühauf et al., 2020; Rice, 2020; Weiss, & Kopp, 2020; Schnitzer, Schöttl, Kopp, & Barth, 2020), Greece is a unexplored area on this subject.

Noting the absence of research regarding the relationship of P.A. in times of pandemic in Greece and internationally, this research is an attempt to record the attitudes and intentions of adults regarding their involvement (or not) in P.A. during the period of the traffic ban due to COVID-19 in Greece. Although the involvement of individuals with P.A. has been studied in previous studies, the uniqueness of this research is the combination of P.A. at a time of extremely critical circumstances, such as a pandemic.

**MATERIAL AND METHODS**

The sample consisted of 904 individuals, 417 men (46.2%), and 487 women (53.8%), between the ages of 18 and 70 years (*MO*=36.26, *SD*=12.48). All subjects completed the Greek version (Theodorakis, 1994) of an anonymous open-ended questionnaire based on the “Theory of Planned Behavior” (Ajzen & Madden, 1986).

More specifically:

*Attitudes* were estimated by the mean score of responses to the question “For me to exercise regularly for the next 2 months, is…”. Responses were rated on 7-point scale, on five bipolar adjectives (7=good – 1=bad, 1=foolish – 7=smart, 7=healthy – 1=unhealthy, 7=useful – 1=unuseful, 7=pleasant – 1=unpleasant).

*Intention*was estimated by the meanscore of the responses to three different questions: “I intend/I will try/ I am determined to exercise regularly for the next 2 months”. Responses to the first question (I intend…) were rated on a 7-point scale from 1=very unlikely to 7=very likely. A 7-point scale with endpoints labeled 1=definitely no to 7=definitely yes was used for the other two questions.

*Subjective Norms*were estimated by the mean score of responses to four questions “If I exercise regularly for the next 2 months, individuals who are important to me…”; “Generally, I enjoy doing what some important individuals want me to do”; “Some individuals who are important in my life, believe that I must exercise regularly for the next 2 months”; “Generally, I like doing what some important individuals want me to do”. Responses were rated on 7-point scales. For questions 1, 2 and 4 responses were rated on 1 = will strongly disagree, to 7 = will strongly agree and for question 3 responses were 1 = very impossible, to 7 = very possible.

*Role Identity* was measured by four questions:“I consider myself to be able to exercise regularly for the next 2 months”; “I consider myself a person that will exercise regularly for the next 2 months”; “It’s in my character (temperament) to exercise regularly for the next 2 months”; “Generally, I am the type who is going to exercise regularly for the next 2 months”. Responses were rated on 7-point scales from 1=strongly disagree to 7=strongly agree.

*Attitude Strength* was measured using eight questions. The items were: “How certain are you that you are going exercise regularly for the next 2 months?”; “Is it right for you to exercise regularly for the next 2 months?”; “I feel very sure that I will exercise regularly for the next 2 months”; “Is it important for you personally, to exercise regularly for the next 2 months?”; “How interested are you in exercising regularly for the next 2 months?”; “For me to exercise regularly for the next 2 months is…”; “With the knowledge I have, I think I will exercise regularly for the next 2 months”; “Do you find it interesting to exercise regularly for the next 2 months?”. Responses were rated on 7-point scales, for the first item from 1=very uncertain to 7=very certain, for the second and sixth items from 1=not at all to 7=very much so, for the third and seventh items from 1=strongly disagree to 7=strongly agree, for the fourth item from 1=not important at all to 7=very important and for the fifth and eighth items from 1=not at all to 7=very much.

*Knowledge* about the specific subject was measured by the mean score of responses to four questions:“Some of us are very well informed about exercising regularly, while other individuals aren’t. How well informed about exercising regularly for the next 2 months do you believe that you are?”; “If someone told you to write anything you know about exercising regularly, how much could you write?”; “In comparison to other people, I believe that I am very well informed on the issue of about exercising regularly for the next 2 months”, “How much do you think that you know on the issue of about exercising regularly for the next 2 months?”. The answers were rated on 7-point scales. For the first question from 1=not informed at all to 7=very well informed, for the second question from 1=very little to 7=a lot, for the third from 1=I strongly disagree to 7=I strongly agree and for the last question from 1=no knowledge at all to 7=a lot of knowledge.

*Information* was measured by four questions: “Some individuals told me that they pay attention to different information about exercising regularly. How much attention do you pay to different information about exercising regularly for the next 2 months?”; “How often do you pay attention to different material with information about exercising regularly?”; “I am very interested in any information regarding about exercising regularly for the next 2 months”; “How often do you pay attention to information regarding about exercising regularly?”. Responses were given on 7-point scales, for the first and fourth questions from 1=I never pay attention to 7=I very often pay attention, for the second from 1=never to 7=very often, for the third from 1=I strongly disagree to 7=I strongly agree and for the fourth from 1=I never pay attention to 7=I pay a lot of attention.

In the end, the sample indicated if they were exercising before and during the pandemic lockdown, by providing a “Yes” or “No” answer (Table 1). And they indicated their weekly physical activity/exercise involvement, if any (Table 2).

**RESULTS**

Univariate analyses were conducted in order to find any differences among individual’s physical activity/exercise level. The analyses revealed the following statistically significant differences: (a) For the variable of “Attitudes”: [*F2*,841= 9.01; p< 0.05], (b) for the variable of “Intention”: [*F*2,841 = 8.721, p<0.05], (c) for the variable of “Self-Identity”: [*F*2,841= 9.82; p< 0.05], (d) for the variable of “Attitude Strength” [*F*2,841 = 5.483, p<0.05], and for the variable of “Subjective Norms” [*F*2,841 = 3.759, p<0.05]. More specifically, the post hoc multiple comparisons Scheffe tests indicated differences between individuals involved in physical activity before and during Pandemic lockdown (Table 3).

**DISCUSSION**

The present study investigated if TPB (Theory of Planned Behavior) can predict possible differences in PA (Physical Activity) behavior during COVID-19 lockdown. More specific the authors attempt to ascertain whether there was a change in complicity in PA before and during COVID-19 quarantine. Moreover, it was an effort to find out which factors affect people’s behavior change. Contrary to the global trend of decrease in PA habits- in China (Qin et al., 2020), in United States (Dunton Wang, Do, & Courtney, 2020; Meyer et al., 2020), in Europe (Cheval et al., 2020; Maltagliati et al., 2020) and Canada (Rhodes, Liu, Lithopoulos, Zhang, & Garcia-Barrera, 2020), findings of this research revealed an increase in involvement in PA during the lockdown comparatively in involvement before it. The above deference seems to be more important, comparing the people who change behavior. As Maltagliati et al. (2020) research showed that people with strong before-lockdown PA habits became weaker during lockdown. Otherwise, people who had less involvement in PA became more energetic. On the contrary, the current research increased both the participation in PA during COVID-19 lockdown and the weekly time’s complicity.

Apropos the increase of participation in PA during COVID-19 lockdown, it is proven that a context change can disrupt existing behaviors (Wood et al., 2005; Verplanken & Wood, 2006; Fredslund & Leppin, 2019). Authors assume that happened because of the enlargement of free time. Lockdown changes people’s routine at all levels. The changes, it brought to their daily obligations, rolled to their diversion activities. The sample of the current study was mostly urban population and highly educated. According to the theory (Shaw & Spokane, 2008), there is the tension of disconnection work from physical activity for people with high educational level. Thus, when a highly educated person leaves his/her job he/she feels that he/she finds more free time for physical activity (Bebetsos & Konstantinidis, in press). Therefore, during the COVID-19 lockdown, considering there was work suspension for most people, the change of attitude towards the PA can be fully justified. Additionally, about the persons who continued to be physically inactive, they could include physical activity in their daily working schedule, so they faced lockdown as a chance to relax.

That causality can explain also the rise of weekly time’s involvement. Before lockdown, the sample declared 5 times per week at most engagement in PA. During COVID-19 lockdown, were created 2 extra categories. Some persons exercised even 7 times during the week during the quarantine. That finding can be justified by previous research, which found a significant association between pre-lockdown and during lockdown PA behaviors (Rhodes et al., 2020). According to them, the availability of home physical activity equipment is a reason for contributed substantially to maintaining and increasing engagement with the PA during COVID-19 lockdown. Our research took place in Greece, where the increase in sports equipment during lockdown was 625.60% (https://www.iefimerida.gr/ellada/agores-koronoioy-proionta-ektoxeysan-poliseis).

Furthermore, people who did not exercise at all reduced to half. Although opportunities for relaxation act as temptations and distract people from their intention to be physically active (Cheval et al., 2020), there is still a general possibility of traffic ban and closure of all places, that used to be a sedentary habit (e.g. bars and taverns), to behave as a springboard for the development of more sporting activities. Fortunately, the cessation of some previous habits, such as going to play football every Saturday, did not act as a deterrent, as would be expected according to the literature (Gardner et al., 2012).

In addition to the logistical infrastructure, one factor that affects the attitude of individuals is the identity of the individual himself. This fact is confirmed both in the present research but is also strengthened by the literature (Kwasnicka, Dombrowski, White, & Sniehotta, 2016; Rhodes & Boudreau, 2017; Soto, 2019; Rhodes et al., 2020). Physical activity identity has a positive correlation with humans’ self-regulation (Strachan, Perras, Forneris, & Stadig, 2017), and the results of this research are fully in line with this theoretical model.

It is proven that planning is a good strategy in physical activity and is a hallmark construct of action control theories (Rhodes & Yao, 2015). The fact that those who stay focused on their home exercise routines would likely have remained unaffected by the COVID-19 restrictions (Rhodes et al., 2020), is also confirmed in our research. The analysis showed that intention is a factor leading to statistically significant differences in the peoples’ engagement in PA. Therefore, the authors recommend the development of strategies targeting at increasing individuals’ intention.

A factor that influenced the behavior of individuals is related to social norms. Socio-economical reasons are mentioned in other research too (Qin et al., 2020; Rhodes et al., 2020), but in negatively. In the areas, where these surveys were conducted, the isolation of individuals may have played an important negative role in their results. Otherwise, in Greece, there is a strong bond between peoples’ families and social environment. This face was captured in our research too, as subjective norms made a difference to the sample change.

One more reason for this increase could be the re-activation of old habits (Maltagliati et al., 2020). Many people return to their parents’ home for the quarantine period or/and some others probably experienced an emotional return to their youth/ student years. Such situations are very likely to evoke habits of the past, such as walking the dog around the block or a strong interest in physical health. In the present study, this justification has a theoretical background, as it is already known that the age level influences the attitude of individuals towards the PA during the lockdown. More specifically, young people have been shown to have stronger attitudes and intentions (Bebetsos, Konstantinidis, & Konstantoulas, in press).

**CONCLUSIONS**

In summary, physical activity can be considered as a part of the positive management of free time during a pandemic. However, possible limitations of the present study should be mentioned, such as the psychological state of individuals in such difficult and unprecedented circumstances. Therefore, follow-up investigations could focus on taking into behaviors in the upcoming months, provided that society has returned to its previous, “normal”, status.

**REFERENCES**

Ajzen, I. (2012) *Handbook of theories of social psychology.* London, UK: Sage.

Ajzen, I., Fishbein, M. (1980) *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I., & Madden, T. J. (1986) Predictions of goal-directed behavior: Attitudes, intentions and perceived behavioral control. *Journal of Experimental Social Psychology*, 22, 453-457.

Ansari, M., & Yousefabad, S. A. (2020) Potential threats of COVID-19 on quarantined families. *Public Health*, *183*, 1.

Bebetsos, E., & Konstantinidis, Ch. (in press) Attitudes towards Physical Activity during COVID-19 Pandemic: The role of education level. *Athlitiki Psychologia.*

Bebetsos, E., Konstantinidis, Ch., & Konstantoulas, D. (in press) Coronavirus Pandemic (COVID-19) and Physical Activity: The important role of gender and age. *Archives of Hellenic Medicine.*

Biddle, S., & Mutrie, N. (2008) *Psychology of physical activity: determinants, well-being, and interventions.* New York: Routledge.

Bouchard, C., Blair, S. N. & Haskell, W. L. (2007) Why study physical activity and health. *Physical Activity and Health*. 3-19.

Cavill, N., Kahlmeier, S. & Racioppi, F. (2006) *Physical activity and health in Europe: Evidence for action*. World Health Organization.

Cheval, B., Sivaramakrishnan, H., Maltagliati, S., Fessler, L., Forestier, C., Sarrazin, P. et al. (2020) Relationships between changes in self-reported physical activity, sedentary behavior and health during the coronavirus (COVID-19) pandemic in France and Switzerland. *Journal of Sports Sciences*, 1-6.

Constandt, B., Thibaut, E., De Bosscher, V., Scheerder, J., Ricour, M., & Willem, A. (2020) Exercising in Times of Lockdown: An Analysis of the Impact of COVID-19 on Levels and Patterns of Exercise among Adults in Belgium. *International Journal of Environmental Research and Public Health*, *17*(11), 4144.

Deschasaux-Tanguy, M., Druesne-Pecollo, N., Esseddik, Y., de Edelenyi, F. S., Alles, B., Andreeva, V. A., et al. (2020) Diet and physical activity during the COVID-19 lockdown period (March-May 2020): results from the French NutriNet-Sante cohort study. *medRxiv*.

doi: <https://doi.org/10.1101/2020.06.04.20121855>

Dunton, G. F., Wang, S. D., Do, B., & Courtney, J. (2020) Early Effects of the COVID-19 Pandemic on Physical Activity Locations and Behaviors in Adults Living in the United States. *Preventive Medicine Reports*, 101241.

Fredslund, E. K., & Leppin, A. (2019). Can the Easter break induce a long-term break of exercise routines? An analysis of Danish gym data using a regression discontinuity design. *BMJ Open*, *9*(2), e024043.

Frühauf, A., Schnitzer, M., Schobersberger, W., Weiss, G., & Kopp, M. (2020) Jogging, nordic walking and going for a walk-inter-disciplinary recommendations to keep people physically active in times of the covid-19 lockdown in Tyrol, Austria. *Current Issues in Sport Science (CISS)*, *5*.

doi: 10.15203/CISS\_2020.100

Gallè, F., Sabella, E. A., Ferracuti, S., De Giglio, O., Caggiano, G., Protano, C. et al. (2020) Sedentary behaviors and physical activity of Italian undergraduate students during lockdown at the time of CoViD−19 pandemic. *International Journal of Environmental Research and Public Health*, *17* (17), 6171.

Gardner, B. (2012). Habit as automaticity, not frequency. *European Health Psychologist*, *14*(2), 32–36.

Goethals, L., Barth, N., Guyot, J., Hupin, D., Celarier, T., & Bongue, B. (2020) Impact of Home Quarantine on Physical Activity Among Older Adults Living at Home During the COVID-19 Pandemic: Qualitative Interview Study.  *JMIR Aging*, *3*(1), e19007.

Kwasnicka, D., Dombrowski, S. U., White, M., & Sniehotta, F. (2016). Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories. *Health Psychology Review*, *10*(3), 277-296.

Lee, A. (2020) Wuhan novel coronavirus (COVID-19): Why global control is challenging?. *Public Health*, *179*, A1-2.

Lee, A., & Morling, J. (2020) COVID19: The need for public health in a time of emergency. *Public Health*, *182*, 188-189.

Maltagliati, S., Rebar, A., Fessler, L., Forestier, C., Sarrazin, P., Chalabaev, A. et al. (pre print) Evolution of Physical Activity Habits After a Context Change: The Case of COVID-19 Lockdown.

<https://doi.org/10.31236/osf.io/e6jfw>

Meyer, J. F., McDowell, C., Lansing, J., Brower, C., Smith, L., Tully, M., & Herring, M. (2020) Changes in physical activity and sedentary behaviour due to the COVID-19 outbreak and associations with mental health in 3,052 US adults. *International Journal of Environmental Research and Public Health*, *17* (17), 6949.

Pietrobelli, A., Pecoraro, L., Ferruzzi, A., Heo, M., Faith, M., Zoller, T. et al. (2020) Effects of COVID‐19 lockdown on lifestyle behaviors in children with obesity living in Verona, Italy: a longitudinal study. *Obesity*, *28*(8), 1382-1385.

Qin, F., Song, Y., Nassis, G. P., Zhao, L., Cui, S., Lai, L., et al. (2020) Prevalence of Insufficient Physical Activity, Sedentary Screen Time and Emotional Well-Being During the Early Days of the 2019 Novel Coronavirus (COVID-19) Outbreak in China: A National Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, *17*(14), 5170.

Rice, W. L., Meyer, C., Lawhon, B., Taff, B. D., Mateer, T., Reigner, N., & Newman, P. (2020) The COVID-19 pandemic is changing the way people recreate outdoors: Preliminary report on a national survey of outdoor enthusiasts amid the COVID-19 pandemic.

<https://doi.org/10.31235/osf.io/prnz9>

Rhodes, R. E., & Boudreau, P. (2017) Physical activity and personality traits. *Oxford Research Encyclopedia of Psychology*.

Rhodes, R. E., Janssen, I., Bredin, S. S., Warburton, D. E., & Bauman, A. (2017) Physical activity: Health impact, prevalence, correlates and interventions. *Psychology & Health*, *32*(8), 942-975.

Rhodes, R. E., & Yao, C. A. (2015). Models accounting for intention-behavior discordance in the physical activity domain: a user’s guide, content overview, and review of current evidence. *International Journal of Behavioral Nutrition and Physical Activity*, *12*(1), 9.

Rhodes, R. E., Liu, S., Lithopoulos, A., Zhang, C., & Garcia-Barrera, M. A. (2020). Correlates of Perceived Physical Activity Transitions during the COVID-19 Pandemic among Canadian Adults. *Applied Psychology: Health and Well-Being*, aphw.12236.

https://doi.org/10.1111/aphw.12236

Sañudo, B., Fennell, C., & Sánchez-Oliver, A. J. (2020) Objectively-Assessed Physical Activity, Sedentary Behavior, Smartphone Use, and Sleep Patterns Pre-and during-COVID-19 Quarantine in Young Adults from Spain.  *Sustainability*, *12* (15), 5890.

Schnitzer, M., Schöttl, S. E., Kopp, M., & Barth, M. (2020). COVID-19 stay-at-home order in Tyrol, Austria: sports and exercise behaviour in change? *Public Health*, *185*, 218-220.

Shaw, B. A., & Spokane, L. S. (2008) Examining the association between education level and physical activity changes during early old age. *Journal of Aging and Health*, *20*, 767-787.

Soto, C. J. (2019) How replicable are links between personality traits and consequential life outcomes? The Life Outcomes of Personality Replication Project. *Psychological Science*, *30*(5), 711-727.

Strachan, S. M., Perras, M. G., Forneris, T., & Stadig, G. S. (2017) I'm an exerciser: Common conceptualisations of and variation in exercise identity meanings. *International Journal of Sport and Exercise Psychology*, *15*(3), 321-336.

Theodorakis, Y. (1994) Planned behavior, attitude strength, self-identity, and the prediction of exercise behavior*. The Sport Psychologist, 8,* 149-165.

Theodorakis, Y., Doganis, G., Bagiatis, K., & Goudas, M. (1991) Preliminary study of the ability of reasoned action model in predicting exercise behavior of young children. *Perceptual and Motor Skills*, *72,* 51-58.

Verplanken, B., & Wood, W. (2006) Interventions to Break and Create Consumer Habits. *Journal of Public Policy & Marketing*, *25*(1), 90-103.

Wood, W., Tam, L., & Witt, M. G. (2005) Changing circumstances, disrupting habits. *Journal of Personality and Social Psychology*, *88*(6), 918-933.