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POSTPRINT¹**“I am fatigued of being stigmatized”:
On the need to investigate stigma-related barriers to physical activity**Aïna Chalabaev^a, Alexandre Mazéas^{a,b}, Cyril Forestier^c, Falko F. Sniehotta^{d,e}^aUniv. Grenoble Alpes, SENS, 38000 Grenoble, France; Orcid: 0000-0002-1806-354X; aina.chalabaev@univ-grenoble-alpes.fr^bINRAE, UNH, CRNH Auvergne, Clermont Auvergne University, Clermont-Ferrand, France; Orcid: 0000-0002-0255-6032; alexandre.mazeas@univ-grenoble-alpes.fr^cLaboratoire Motricité, Interactions, Performance, MIP - EA4334, Université de Nantes, France; Orcid: 0000-0001-8154-5296; cyril.forestier@univ-nantes.fr^dNIHR Policy Research Unit in Behavioural Science – Population Health Sciences Institute, Faculty of Medical Sciences, Newcastle University, UK^eDepartment of Public Health, Preventive and Social Medicine, Center for Preventive Medicine and Digital Health Baden-Wuerttemberg, Heidelberg University, Germany; Orcid: 0000-0003-1738-4269; Falko.Sniehotta@medma.uni-heidelberg.de^{*}Corresponding author information: Aïna Chalabaev, Univ. Grenoble Alpes, SENS, 38000 Grenoble, France; aina.chalabaev@univ-grenoble-alpes.fr; phone +33 (0)4 76 63 50 81**Abstract**

Understanding what predicts behavior change is a hot topic in health psychology, especially with regard to physical activity. While existing research has revealed key factors of physical activity (e.g., reasoned cognitions, automatic processes), it fails to accurately identify those that are specific to the most inactive populations (e.g., older adults, obese individuals, women, people living with chronic disease). In this commentary, we propose to articulate current approaches of health behavior change with the social psychology of stereotypes, based on the observation that inactive groups are often targeted by negative stereotypes. This articulation may allow to better identify the barriers to physical activity that are specific to individuals from the most inactive groups. More particularly, we propose that low self-control resources, indexed by perceived fatigue, and negative self-perceptions may be key factors of physical inactivity in these individuals. This proposition could in turn help to explain why some behavioral change techniques that are efficient in healthy or young adults are inefficient in other individuals.

Keywords : health behavior change models ; stereotypes models; self-control fatigue; self-perceptions**Résumé**

Comprendre ce qui prédit le changement de comportement est un sujet brûlant en psychologie de la santé, notamment en ce qui concerne l'activité physique. Si les recherches existantes ont révélé des facteurs clés de l'activité physique (par exemple, les cognitions raisonnées, les processus automatiques), elles ne parviennent pas à identifier précisément ceux qui sont spécifiques aux populations les plus inactives (par exemple, les personnes âgées, les personnes en surpoids, les femmes, les personnes vivant avec une maladie chronique). Dans ce commentaire, nous proposons d'articuler les approches actuelles du changement de comportements de santé avec la psychologie sociale des stéréotypes, en partant du constat que les groupes inactifs sont souvent la cible de stéréotypes négatifs. Cette articulation peut permettre de mieux identifier les barrières à l'activité physique qui sont spécifiques aux individus issus des groupes les plus inactifs. Plus particulièrement, nous proposons que de faibles ressources de contrôle de soi, indexées par la fatigue perçue, et des perceptions négatives de soi sont des facteurs clés de l'inactivité physique chez ces individus. Cette proposition pourrait contribuer à expliquer pourquoi certaines techniques de changement de comportement, efficaces chez des adultes jeunes ou en bonne santé, sont inefficaces chez d'autres individus.

Mots-clés : modèles du changement de comportement ; modèles liés aux stéréotypes; fatigue du contrôle de soi ; perceptions de soi

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“I am fatigued of being stigmatized”: On the need to investigate stigma-related barriers to physical activity

« Je suis fatigué.e d’être stigmatisé.e » : Sur la nécessité d’étudier les barrières à l’activité physique liées à la stigmatisation

Promoting physical activity is a major public health challenge. Despite evidence of its health benefits, more than 25% of adults are insufficiently active worldwide (e.g., Rhodes et al., 2017), resulting in 5-million deaths per year (Bull et al., 2020). Moreover, these average rates mask strong disparities, some groups being more inactive than others, such as women, older adults, or people living in disadvantaged socioeconomic conditions (e.g., Bauman et al., 2012; Hallal et al., 2012; World Health Organization, 2022). These disparities are alarming as they may result in social inequalities in health. As such, understanding and promoting physical activity in various groups is a pressing priority.

Abundant research in psychology strives to explain health behaviors and physical activity in particular (for a review see Rhodes et al., 2019). Much of the current debate focuses on the extent to which behaviors are determined by reasoned processes (e.g., attitude, self-efficacy, intention) and/or automatic ones (e.g., habit, implicit motivation and affect) (e.g., Brand & Ekkekakis, 2018; Cheval & Boisgontier, 2021, Rhodes, 2017). Such debate is of great importance. However, it tends to overlook how these individual-level factors articulate with contextual ones, whether cultural (e.g., social norms and stereotypes) or material (e.g., economic resources, urban environment). We argue that taking into account these factors is crucial to understand why some groups are more physically inactive than others.

One may stipulate that the psychology approach of health behaviors does in fact consider contextual factors. In his sufficiency hypothesis, Ajzen (2011) proposes that individual cognitions fully mediate the impact of such factors on behaviors. For example, having insufficient free time due to family and job constraints (contextual factors) may lead individuals to believe they are not capable of engaging in regular physical activity (self-efficacy), favoring in turn physical inactivity. If individual-level factors fully carried the influence of contextual ones, the psychological approach would be sufficient to explain physical activity. However, this is not the case, as contextual factors explain additional variance in behavior once individual cognitions are controlled. For example, intention and self-efficacy only partially mediate the relationships between contextual variables (sociodemographic, health-related, interpersonal and environmental) and physical activity (e.g., Teran-Escobar et al., 2021; Sniehotta et al., 2013). Therefore, the sufficiency hypothesis is not sufficient to explain physical activity. The current article makes theoretical propositions to better include contextual factors within the psychology approach of health behaviors.

Bridging contextual and individual factors through the social psychology of stereotypes: A research agenda

One way to address this issue is to articulate individual- and context-centered models. For example, Ravis et al. (2006) completed the theory of planned behavior with the prototype/willingness theory (Gibbons et al., 1998), which models social influences on health behaviors, in order to better understand the factors of health-risks behaviors in adolescents. In their model, Gibbons et al. (1998) proposed that adolescents are influenced by the images they have

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about the type of person who engages in a risky behavior (prototypes). In particular, the more they positively evaluate and perceive similarity to these prototypes, the greater is their willingness to engage in similar behavior. Engagement in risky behavior is also more likely when most significant others adopt such behavior (descriptive norm). Based on these propositions, Ravis et al. (2006) showed that prototype willingness and descriptive norms contributed to an increment of 5% in the variance of behavioral intentions, once the variables of the theory of planned behavior were controlled.

In the same vein, we propose to articulate the psychology approach of behavior change with the social psychology of stereotypes, defined as shared beliefs about personal characteristics of a group of people (e.g., Leyens et al., 1994), in order to better understand the factors of physical activity that are specific to the most inactive populations. This proposition is based on the observation that most inactive populations share one characteristic: they are targeted by negative stereotypes, such as: “females lack physical abilities”, “older adults are fragile”, or “poor people are lazy” (e.g., Cuddy et al., 2007). We consider stereotypes as center stage to bridge contextual and individual factors of physical activity, based on the distinction between the context and the situation recently proposed by Freund et al. (2021). According to these authors, the context refers to all aspects outside the person (e.g., social norms and stereotypes, discrimination), and the situation to concrete aspects of the context as perceived by the individual at the very moment. Stereotypes are part of the cultural milieu and constitute as such a contextual factor. However, people may vary in their knowledge or endorsement of stereotypes, and in the extent to which a given situation is perceived as discriminatory. In other words, a situation in which stereotypes may apply represents a place where transactional relationships between the individual and the context takes place.

Interestingly, social stereotypes have been shown to affect health behaviors through several psychological processes, referring notably to *social identity threat* and *stereotype internalization* (see Chalabaev & Sarrazin, 2020; Chalabaev et al., 2013 for reviews in the physical activity domain). Articulating psychological models of health behaviors with these processes could shed new light on factors of physical activity that are specific to people from inactive groups. More particularly, we propose that stigmatization is likely to trigger failure of self-regulatory processes such as self-control fatigue, as well as negative self-perceptions, which in turn act as barriers to physical activity. The theoretical rationale and empirical support underlying this proposition is developed next.

How do stereotypes affect physical activity?

A social identity threat approach of physical inactivity

Social identity threat occurs when individuals are concerned that they will be devalued because of their social identity (e.g., as a female, older adult, overweight person). This psychological state arises in situations where negative stereotypes may apply: for example, when females perform a physical activity stereotyped as masculine, or when an overweight individual exercises in a gymnasium where there are only normal-weight people (e.g., Myre et al., 2021). Once triggered, stereotypic concerns generate unpleasant stress-related responses, including negative thoughts and affect, increased cardiovascular responses, and avoidance behaviors. Consequences of these stress responses have been examined mainly on performance outcomes in the stereotype threat theory (Steele & Aronson, 1995; Schmader et al., 2008), with studies consistently showing negative effects of stereotype threat on cognitive and motor performance (see Gentile et al., 2018 for a meta-analysis of stereotype threat effects on motor performance).

Recently, stereotype threat theory has been extended to health behaviors and outcomes. The social identity threat concept is used in reference to this theoretical extension (Major et al., 2018).

Central here, stereotype threat theory proposes that the chronic psychological discomfort experienced when exposed to negative stereotypes may lead people to disidentify from the domain (i.e., not caring anymore about the domain in relation to the self), undermining in turn their motivation for the domain (Steele, 1997). This suggests that people who experience stereotype-related stress when they exercise could adapt to this uncomfortable situation by disidentifying from the physical activity domain, in other words, by considering that physical activity is not so important after all. In turn, such reaction could generate a motivational conflict: on the one hand, stigmatized people may pursue the long-term goal to approach physical activity, but on the other hand, they may will to avoid this domain, due to the unpleasant feelings associated with it.

According to the self-control literature, overriding a motivational conflict through self-control acts may be effortful, for example when one strives to inhibit immediate temptations in order to act congruently with an incompatible long-term goal (e.g., Muraven & Baumeister, 2000). Self-control acts may result in self-control fatigue, defined by Forestier et al. (2022) as reduced self-control resources (i.e., perceived mental resources or energy available to self-regulate, Clarkson et al., 2016), reduced willingness to exert self-control, and/or reduced self-control capacity (e.g., reduced executive functioning). We propose that stereotypes could act as a barrier to physical activity by triggering motivational conflicts, whose resolution necessitates self-control acts, leading in turn to self-control fatigue (see Figure 1).

Inzlicht and Kang (2010) provided initial support for this hypothesis. They showed that women facing negative stereotypes failed to regulate their behaviors afterwards, because coping with social identity threat consumed their self-control resources. Several studies corroborated that stigma may reduce self-control processes, mainly in the domain of weight stigma and eating behaviors (e.g., Araiza & Wellman, 2017; Major et al., 2014; Major et al., 2020). Few studies explored these processes in the physical activity domain. Those that have done so were observational, showing that endorsement of negative age stereotypes (Emile et al., 2015) and internalization of weight bias (Rojas-Sanchez et al., 2021) were associated with lower perceived energy, used as an index of self-control resources. In turn, lower perceived energy was associated with lower physical activity (Rojas-Sanchez et al., 2021). An experiment also provided tentative support for this hypothesis (Chiviawosky et al., 2018). It showed that inducing negative stereotypes affected balance of older adults, not immediately but in the long term. The authors suggested that older adults were able to control their stereotype-related thoughts and feelings when the threat occurred, but not later, possibly because this immediate self-regulation act decreased their self-control resources thereafter.

These preliminary results are promising and we urge researchers to investigate more rigorously the role of social identity threat in the physical activity regulation of individuals from the most inactive groups. Indeed, several questions deserve empirical support: Do stereotypic concerns trigger negative affect toward physical activity? Does affect generate a motivational conflict with people's goal to be physically active? If so, does this conflict lead to self-control fatigue? Given that this type of fatigue involves not only resources, but also willingness to engage in a self-control act, and cognitive capacity to do so (e.g., inhibitory control, working memory) (Forestier et al., 2022), it could be interesting to examine if social identity threat alters not only self-control resources but also other self-control components, and notably capacity. Stereotype threat has indeed been shown to interfere with one's ability to maintain task goals in working memory (Hutchison et al., 2013), which could prevent self-control success.

Answering these questions will be possible by articulating the social psychology of stereotypes with recent self-control models (e.g., integrative self-control model of Kotabe & Hofmann, 2015; see Forestier et al., 2018 for application in the physical activity domain; Forestier et al., 2022) and the dual-process approach (e.g., Brand & Ekkekakis, 2018; Cheval & Boisgontier, 2021; Conroy & Berry, 2017). For example, the affective-reflective theory of physical inactivity and exercise (Brand & Ekkekakis, 2018) proposes that exercise-related stimuli trigger automatic affective valuation of exercise. When there is a discrepancy between this automatic process and the reflective evaluation of exercise, and that self-control resources are low, behavior is more likely to be influenced by the automatic affective process. If social identity threat fosters an automatic negative affective valuation of exercise, the affective-reflective theory of physical inactivity would nicely complement the social identity threat approach. Overall, corroboration of the social identity threat hypothesis would shed light on processes that are specific to individuals who belong to the most inactive groups, and that constitute an additional barrier to their physical activity engagement and maintenance. Other questions deserve further investigation, such as how and why different social identities interact with each other (e.g., gender and socioeconomic conditions; Chalabaev et al., 2021) to predict physical activity.

A stereotype internalization approach of physical inactivity

Stereotype internalization is the incorporation of negative societal views in the self-concept. It occurs when people perceive themselves in conformity with ingroup stereotypes (e.g., Bonnot & Croizet, 2007; Mc Kown & Weinstein, 2003). As such, if these stereotypes are negative, self-perceptions may be negative as well. This is problematic because of the relationships consistently observed between self-perceptions and behavior. For example, research indicates that girls feel less competent in sports than boys, which is associated with the sex differences observed in sport participation (e.g., Fredricks & Eccles, 2005). In overweight people, weight bias internalization (i.e., the tendency to accept and blame oneself for negative weight-based stereotypes) is also associated with reduced physical activity (e.g., Vartanian & Shaprow, 2008; Vartanian & Novak, 2011; Rojas-Sanchez et al., 2021). Similarly, age stereotypes seem to be assimilated into general self-perceptions of aging (e.g., “I think that things get worse with aging”), which are in turn associated with physical activity participation (e.g., Emile et al., 2015), and with health behaviors more generally, after controlling for covariates such as age, education, and health (e.g., Levy & Myers, 2004).

Stereotype internalization includes sociocognitive processes that are related to self-perceptions and attitudes (e.g., perceived competence, self-esteem, attitudes toward aging), as in sociocognitive models of behavior change (e.g., theory of planned behavior, Ajzen, 1991). This could result in augmented theories such as the one proposed by Ravis et al. (2006). Future research could assess how sociocognitive constructs (e.g., self-efficacy, attitudes, intention) correlate with stereotype internalization ones (e.g., stereotype awareness, endorsement, internalization) (see Figure 1).

In sum, a better identification of the specific barriers faced by stigmatized people could be allowed by investigating two main research questions: 1) How does social identity threat predict physical activity, and more particularly, what is the role of affect, motivational conflict, and self-control components in this relationship? 2) How do stereotype internalization and sociocognitive constructs articulate with each other to predict physical activity (i.e., in an independent, mediational, and/or interactive manner)?

Implications for intervention

Articulating the psychological approach of physical activity with the social psychology of stereotypes has also implications for practice. Indeed, this approach could help to explain why some behavioral change techniques that are efficient in healthy or young adults are inefficient in other individuals. For example, French et al.'s (2014) systematic review showed that techniques requiring self-regulatory skills (e.g., goal setting, coping planning, self-monitoring of behavior) have deleterious effects on older adults' self-efficacy and physical activity, while other strategies such as motivational interviewing have positive effects. If older adults experience fatigue due to reduction of their self-control resources, as suggested by the social identity threat hypothesis, this could explain why techniques that rely on self-regulatory skills are deleterious, and why motivational interviewing, a technique that may help to restore self-control resources, is beneficial (e.g., Ryan & Deci, 2008). Other explanations are however possible: people may become increasingly selective as they age, and choose to invest resources only in goals and activities that are meaningful (e.g., socioemotional selectivity theory, Carstensen et al., 1999; selection, optimization, and compensation theory, Baltes, 1997). These different possibilities highlight the need to empirically investigate why the efficacy of behavioral change techniques may differ depending on the population of interest.

In addition, promising results have been observed in older adults from interventions that articulate behavior change and stereotypes models. Such interventions typically couple behavior change techniques (e.g., information about health consequences, social support) with techniques aimed at fostering positive self-perceptions of aging, for example by providing information about positive aspects of aging, or by raising and correcting false beliefs and misconceptions of aging (for a systematic review see Knight et al., 2021). Other interventions based on the social identity approach (Haslam, 2004) are promising. Based on the social identity theory (Tajfel & Turner, 1979) and the self-categorization theory (Turner et al., 1987), this perspective considers that individuals can define themselves either as a function of personal attributes (i.e., personal identity as "I" and "me"), or social categories (i.e., social identity as "we" and "us"). The way people define themselves may in turn influence their cognitions and behaviors. Specifically, when a social identity is made salient, people are more likely to behave consistently with the characteristics defining the group (Reynolds et al., 2020).

Relevant here, Jetten et al. (2018) proposed that social identity salience can act as a psychological resource to cope with stigma when people are in a health behavior change context. At first, this proposition may seem paradoxical. Indeed, the stereotype and social identity threat literature suggests that activation of a stigmatized social identity has detrimental effects on health behaviors. However, the social identity perspective proposes that the group membership of stigmatized individuals may be both the problem and the solution to cope with the negative effects of group membership (Jetten et al., 2018). More particularly, participants who share the same stigmatizing characteristic within a physical activity program (e.g., related to age, weight, health) may feel similar to the other participants – allowing the emergence of a greater sense of belonging, social connectivity, and social cohesion (Beauchamp, 2019; Beauchamp & Rhodes, 2020; Beauchamp et al., 2007; Dunlop & Beauchamp, 2011; Rhodes et al., 2016; Stevens et al., 2022; Strachan & Whaley, 2013). In turn, this social support may act as a "social cure" (Jetten et al., 2012) and could help people to overcome stereotype-related barriers (Jetten et al., 2018; Olander et al., 2013), by attenuating the deleterious impact of stereotype internalization and social identity threat. Again, research is needed to provide empirical support to this assertion.

Conclusion

Articulating psychological models of physical activity with the social psychology of stereotypes may enable to better understand the specific barriers faced by individuals belonging to the most inactive groups. This is crucial to better enlighten the elaboration of behavioral interventions. Indeed, if our proposition that these individuals are particularly likely to experience self-control fatigue and negative self-perceptions is empirically corroborated, this may have implications regarding which behavioral change techniques need to be privileged, and which ones need in contrast to be avoided.

Although our proposition may seem speculative, most assertions on which it is founded have received empirical support. On the one hand, there is consistent evidence that negative stereotypes have deleterious effects on physical activity, through social identity threat and stereotype internalization processes. On the other hand, there is evidence that motivational conflict leads to self-control fatigue and limits adoption of healthy behaviors, and that social cognitions predict physical activity. However, what is missing is the empirical examination of how stereotype-related and psychological factors articulate with each other to predict physical activity.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211. Doi:10.1016/0749-5978(91)90020-T
- Ajzen, I. (2011). The theory of planned behavior: Reactions and reflections. *Psychology & Health*, 26, 1113-1127. Doi:10.1080/08870446.2011.613995
- Araiza, A. M., & Wellman, J. D. (2017). Weight stigma predicts inhibitory control and food selection in response to the salience of weight discrimination. *Appetite*, 114, 382-390. Doi:10.1016/j.appet.2017.04.009
- Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, Optimization, and Compensation as foundation of developmental theory. *American Psychologist*, 52(4), 366-380. Doi:10.1037/0003-066X.52.4.366
- Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., Martin, B. W., & Lancet Physical Activity Series Working Group. (2012). Correlates of physical activity: why are some people physically active and others not?. *The Lancet*, 380, 258-271. Doi:10.1016/S0140-6736(12)60735-1
- Beauchamp, M. R. (2019). Promoting exercise adherence through groups A self-categorization theory perspective. *Exercise & Sport Sciences Reviews*, 47, 54-61.
- Beauchamp, M. R., Carron, A. V., McCutcheon, S., & Harper, O. (2007). Older adults' preferences for exercising alone versus in groups: Considering contextual congruence. *Annals of Behavioral Medicine*, 33(2), 200-206. Doi:10.1007/BF02879901
- Beauchamp, M. R., & Rhodes, R. E. (2020). A Group-mediated approach to precision medicine - Social identification, prevention, and treatment. *JAMA Psychiatry*, 77, 555-556.
- Bonnot, V., & Croizet, J. C. (2007). Stereotype internalization and women's math performance: The role of interference in working memory. *Journal of Experimental Social Psychology*, 43(6), 857-866.
- Brand, R., & Ekkekakis, P. (2018). Affective-Reflective Theory of physical inactivity and exercise: Foundations and preliminary evidence. *German Journal of Exercise and Sport Research*, 48(1), 48-58. Doi:10.1007/s12662-017-0477-9
- Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J.-P., Chastin, S., Chou, R., Dempsey, P. C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., Lamber, E., Leitzmann, M., Milton, K., Ortega, F. B., Ranasinghe, C., Stamatakis, E., Tiedemann, A., Troiano, R. P., van der Ploeg, H. P., Wari, V., & Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, 54(24), 1451-1462.
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, 54(3), 165-181. Doi:10.1037/0003-066X.54.3.165
- Chalabaev, A., & Sarrazin, P. (2020). Putting individual motivations into the societal context: The influence of social stereotypes in the physical activity domain. In G. Tenenbaum & R. C. Eklund (Eds). *Handbook of Sport Psychology* (4th ed.) (pp.19-36). John Wiley & Sons.
- Chalabaev, A., Sarrazin, P., Fontayne, P., Boiché, J., & Clément-Guillotin, C. (2013). The influence of sex stereotypes and gender roles on participation and performance in sport and exercise: Review and future directions. *Psychology of Sport and Exercise*, 14, 136-144. Doi:10.1016/j.psychsport.2012.10.005
- Chalabaev, A., Sieber, S., Sander, D., Cullati, S., Maltagliati, S., Sarrazin, P., Boisgontier, M. P., & Cheval, B. (2021). Early-life socioeconomic circumstances and physical activity in older age: Women pay the price. *Psychological Science*.
- Cheval, B., & Boisgontier, M. P. (2021). The Theory of Effort Minimization in Physical Activity. *Exercise and Sport Sciences Reviews*, 49(3), 168-178. Doi:10.1249/JES.0000000000000252
- Chiviawosky, S., Cardozo, P. L., & Chalabaev, A. (2018). Age stereotypes' effects on motor learning in older adults: The impact may not be immediate, but instead delayed. *Psychology of Sport and Exercise*, 36, 209-212. Doi:10.1016/j.psychsport.2018.02.012
- Clarkson, J. J., Otto, A. S., Hassey, R., & Hirt, E. R. (2016). Perceived mental fatigue and self-control. *Self-regulation and ego control*. Vol. 185.
- Conroy, D. E., & Berry, T. R. (2017). Automatic affective evaluations of physical activity. *Exercise and Sport Sciences Reviews*, 45(4), 230-237. Doi:10.1249/JES.0000000000000120
- Cuddy, A. J., Fiske, S. T., & Glick, P. (2007). The BIAS map: behaviors from intergroup affect and stereotypes. *Journal of Personality and Social Psychology*, 92(4), 631-648.
- Dunlop, W. L., & Beauchamp, M. R. (2011). Does similarity make a difference? Predicting cohesion and attendance behaviors within exercise group settings. *Group Dynamics*, 15(3), 258-266. Doi:10.1037/a0023642
- Emile, M., d'Arripe-Longueville, F., Cheval, B., Amato, M., & Chalabaev, A. (2015). An ego depletion account of aging stereotypes' effects on health-related variables. *The Journals of Gerontology Series B*, 70, 876-885. Doi:10.1093/geronb/gbu168
- Forestier, C., de Chanaleilles, M., Boisgontier, M. P., & Chalabaev, A. (2022). From ego depletion to self-control fatigue: A review of criticisms along with new perspectives for the investigation and replication of a multicomponent phenomenon. *Motivation Science*, 8, 19-32. Doi:10.1037/mot0000262
- Forestier, C., Sarrazin, P., Allenet, B., Gauchet, A., Heuzé, J.-P., & Chalabaev, A. (2018). "Are you in full possession of your capacity?" A mechanistic self-control approach at trait and state levels to predict different health behaviors. *Personality and Individual Differences*, 134, 214-221. Doi:10.1016/j.paid.2018.05.044
- Fredricks, J. A., & Eccles, J. S. (2005). Family socialization, gender, and sport motivation and involvement. *Journal of Sport and Exercise Psychology*, 27, 3-31. Doi:10.1123/jsep.27.1.3

- French, D. P., Olander, E. K., Chisholm, A., & Mc Sharry, J. (2014). Which behaviour change techniques are most effective at increasing older adults' self-efficacy and physical activity behaviour? A systematic review. *Annals of Behavioral Medicine*, 48, 225-234. Doi:10.1007/s12160-014-9593-z
- Freund, A. M., Hennecke, M., Brandstätter, V., Martin, M., Boker, S. M., Charles, S. T., Fishbach, A., Hess, T. M., Heckhausen, J., Gow, A. J., Isaacowitz, D. M., Klusmann, V., Lachman, M. E., Mayr, U., Oettingen, G., Robert, P., Röcke, C., Rothermund, K., Scholz, U., Tobler, P. N., Zacher, H., & Zadeh, R. (2021). Motivation and healthy aging: A heuristic model. *Journals of Gerontology: Series B, Psychological Sciences and Social Sciences*, 76(S2), S97-S104. Doi:10.1093/geronb/gbab128
- Gentile, A., Boca, S., & Giammusso, I. (2018). 'You play like a Woman!' Effects of gender stereotype threat on Women's performance in physical and sport activities: A meta-analysis. *Psychology of Sport and Exercise*, 39, 95-103. Doi:10.1016/j.psychsport.2018.07.013
- Gibbons, F. X., Gerrard, M., Blanton, H., & Russell, D. W. (1998). Reasoned action and social reaction: Willingness and intention as independent predictors of health risk. *Journal of Personality and Social Psychology*, 74(5), 1164-1180. Doi:10.1037/0022-3514.74.5.1164
- Hallal, P. C., Andersen, L. B., Bull, F. C., Guthold, R., Haskell, W., Ekelund, U., & Lancet Physical Activity Series Working Group. (2012). Global physical activity levels: surveillance progress, pitfalls, and prospects. *The Lancet*, 380, 247-257. Doi:10.1016/S0140-6736(12)60646-1
- Haslam, S. A. (2004). *Psychology in organizations*. Sage.
- Hutchison, K. A., Smith, J. L., & Ferris, A. (2013). Goals can be threatened to extinction: Using the Stroop task to clarify working memory depletion under stereotype threat. *Social Psychological and Personality Science*, 4, 74-81. Doi: 10.1177/1948550612440734
- Inzlicht, M., & Kang, S. K. (2010). Stereotype threat spillover: how coping with threats to social identity affects aggression, eating, decision making, and attention. *Journal of Personality and Social Psychology*, 99, 467-481. Doi:10.1037/a0018951
- Jetten, J., Haslam, C., & Alexander, S. H. (2012). *The social cure: Identity, health and well-being*. Psychology press.
- Jetten, J., Haslam, S. A., Cruwys, T., & Branscombe, N. R. (2018). Social identity, stigma, and health. In B. Major, J. F. Dovidio, & B. G. Link (Eds.), *The Oxford handbook of stigma, discrimination, and health* (pp. 301-316). Oxford University Press. <https://psycnet.apa.org/record/2017-57025-016>
- Knight, R. L., Chalabaev, A., Mackintosh, K. A., McNarry, M. A., & Hudson, J. (2021). Do age stereotype-based interventions affect health-related outcomes in older adults? A systematic review and future directions. *British Journal of Health Psychology*. Doi:10.1111/bjhp.12548
- Kotabe, H., & Hofmann, W. (2015). On integrating the components of self-control. *Perspectives on Psychological Science*, 10(5), 618-638. Doi:10.1177/1745691615593382.
- Levy, B. R., & Myers, L. M. (2004). Preventive health behaviors influenced by self-perceptions of aging. *Preventive Medicine*, 39(3), 625-629. Doi:10.1016/j.ypmed.2004.02.029
- Leyens, J.-P., Yzerbyt, V., & Schadron, G. (1994). *Stereotypes and social cognition*. Sage Publications Inc.
- Major, B., Hunger, J. M., Bunyan, D. P., & Miller, C. T. (2014). The ironic effects of weight stigma. *Journal of Experimental Social Psychology*, 51, 74-80. Doi:10.1016/j.jesp.2013.11.009
- Major, B., Tomiyama, A. J., & Hunger, J. M. (2018). The negative and bidirectional effects of weight stigma on health. In B. Major, J. Dovidio, & B. G. Link (Eds.), *The Oxford Handbook of Stigma, Discrimination, and Health* (pp. 499-519). Oxford University Press
- Major, B., Rathbone, J. A., Blodorn, A., & Hunger, J. M. (2020). The countervailing effects of weight stigma on weight-loss motivation and perceived capacity for weight control. *Personality and Social Psychology Bulletin*, 46, 1331-1343. Doi:10.1177/0146167220903184
- Mc Kown, C., & Weinstein, R. S. (2003). The development and consequences of stereotype consciousness in middle childhood. *Child Development*, 74, 498-515.
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle?. *Psychological Bulletin*, 126, 247-259. Doi:10.1037/0033-2909.126.2.247
- Myre, M., Glenn, N. M., & Berry, T. R. (2021). Exploring the impact of physical activity-related weight stigma among women with self-identified obesity. *Qualitative Research in Sport, Exercise and Health*, 586-603. Doi:10.1080/2159676X.2020.1751690
- Olander, E. K., Fletcher, H., Williams, S., Atkinson, L., Turner, A., & French, D. P. (2013). What are the most effective techniques in changing obese individuals' physical activity self-efficacy and behaviour: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 10, 29. Doi:10.1186/1479-5868-10-29
- Reynolds, K. J., Branscombe, N. R., Subasić, E., & Willis, L. (2020). Changing behavior using social identity processes. In M. S. Hagger, L. D. Cameron, K. Hamilton, N. Hankonen, & T. Lintunen (Eds.), *The Handbook of Behavior Change* (pp. 225-236).
- Rhodes, R.E. (2017). The evolving understanding of physical activity behavior: A multi-process action control approach. In A. J. Elliot (Ed), *Advances in Motivation Science*. (pp. 171-205).
- Rhodes, R. E., Janssen, I., Bredin, S. S. D., Warburton, D. E. R., & Bauman, A. (2017). Physical activity: Health impact, prevalence, correlates and interventions. *Psychology and Health*, 32(8), 942-975. Doi:10.1080/08870446.2017.1325486
- Rhodes, R. E., Kaushal, N., & Quinlan, A. (2016). Is physical activity a part of who I am? A review and meta-analysis of

- identity, schema and physical activity. *Health Psychology Review*, 10, 204-225.
- Rhodes, R. E., McEwan, D., & Rebar, A. L. (2019). Theories of physical activity behaviour change: A history and synthesis of approaches. *Psychology of Sport and Exercise*, 42, 100-109. Doi:10.1016/j.psychsport.2018.11.010
- Rivis, A., Sheeran, P., & Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology*, 11(3), 483-500. Doi:10.1348/135910705X70327
- Rojas-Sanchez, A., Sarrazin, P., Major, B., Joët, G., & Chalabaev, A. (2021). Motivational processes of the relationship between weight stigma and physical activity: a comparison of models with French and Mexican adults. *International Journal of Sport and Exercise Psychology*. Doi:10.1080/1612197X.2021.1956565
- Ryan, R. M., & Deci, E. L. (2008). From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Social and Personality Psychology Compass*, 2, 702-717. Doi:10.1111/j.1751-9004.2008.00098.x
- Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological review*, 115(2), 336-356.
- Sniehotta, F. F., Gellert, P., Witham, M. D., Donnan, P. T., Crombie, I. K., & McMurdo, M. E. (2013). Psychological theory in an interdisciplinary context: psychological, demographic, health-related, social, and environmental correlates of physical activity in a representative cohort of community-dwelling older adults. *International Journal of Behavioral Nutrition and Physical Activity*, 10, 106. Doi:10.1186/1479-5868-10-106
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, 69, 797-811. Doi:10.1037/0022-3514.69.5.797
- Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, 52, 613-629. Doi:10.1037/0003-066X.52.6.613
- Stevens, M., White, S., Robertson, A. M., & Cruwys, T. (2022). Repeated exercise class attendance: The role of class members' similarity and social identification. *Psychology of Sport and Exercise*, 102212.
- Strachan, S. M., & Whaley, D. E. (2013). Identities, schemas, and definitions: how aspects of the self influence exercise behaviour. In P. Ekkekakis (Ed.), *Handbook of physical activity and mental health* (pp. 212-223). Routledge.
- Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp.33-47). Brooks/Cole.
- Teran-Escobar, C., Forestier, C., Ginoux, C., Isoard-Gautheur, S., Sarrazin, P., Clavel, A., & Chalabaev, A. (2021). Individual, Sociodemographic, and Environmental Factors Related to Physical Activity During the Spring 2020 COVID-19 Lockdown. *Frontiers in Psychology*, 12, 643109. Doi:10.3389/fpsyg.2021.643109
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Blackwell.
- Vartanian, L. R., & Novak, S. A. (2011). Internalized societal attitudes moderate the impact of weight stigma on avoidance of exercise. *Obesity*, 19, 757-762. Doi:10.1038/oby.2010.234
- Vartanian, L. R., & Shaprow, J. G. (2008). Effects of weight stigma on exercise motivation and behavior: A preliminary investigation among college-aged females. *Journal of Health Psychology*, 13(1), 131-138. Doi:10.1177/1359105307084318
- World Health Organization (2022). *Global status report on physical activity 2022*. Geneva, Licence: CC BY-NC-SA 3.0 IGO.

Figure 1

A two-way process model of stereotypes effects on physical activity

