Let’s (Tik) Talk About Fitness Trends

Valdemar Štajer1, Ivana M. Milovanović1, Nikola Todorović1, Marijana Ranisavljev1, Saša Pišot2 and Patrik Drid1*

1 Faculty of Sport and Physical Education, University of Novi Sad, Novi Sad, Serbia; 2 Institute for Kinesiology Research, Science and Research Centre Koper, Koper, Slovenia

Several factors that follow the development of society affect physical inactivity, which primarily includes the development of technology and digitalization and the increasing choice of unhealthy lifestyle habits. However, certain shifts in the fitness industry have been noted in the last decade. The development of wearable technologies and artificial intelligence is one of the leading fitness trends and undoubtedly represents the future of the fitness industry. On the other hand, the significant influence of social media and networks affects the development and attitudes of people related to physical activity. Therefore, this review paper evaluates the advantages and disadvantages of wearable technologies and artificial intelligence, the positive and negative effects of social networks, and points out the problems accompanying these new fitness trends. The development of fitness trends follows humanity’s needs, and one of the biggest challenges is incorporating these novelties in a mission to improve physical activity levels worldwide.

Keywords: modern technologies, social media, social networking platform, physical activity, wearable technologies

INTRODUCTION

Physical activity (PA) is a generator for the improvement of quality of life. PA provides a broad spectrum of health benefits, including the decreased risk of early death, coronary heart disease, stroke, hypertension, type 2 diabetes, cancers, weight gain, risk of dangerous falls, anxiety, and cognitive decline (1, 2). Moreover, relatively robust scientific evidence indicates that exercise supports functional capacity in older adults, enhances sleep quality, and decreases the hazard of hip rupture and osteoporosis (3, 4). World Health Organization (WHO) reported that the minimum quantity and quality of PA that needs to be archived is 150 min/week of moderate PA or 75 min/week of vigorous-intensity (5). This only represents the minimum equality of time that one needs to be active, but promoting an even more physically active lifestyle could fill the gap and contribute even more to subjects’ health and wellbeing (6).

However, people do not engage in this minimum amount of PA recommended. At this moment, we are facing the pandemic of physical inactivity (PI) and obesity (7). Around 31.1% of adults are physically inactive worldwide, with ratios ranging from 17% in Southeast Asia to about 43% in the Americas and the eastern Mediterranean (8). It was also noted that inactivity raises with age and is more represented among the female population and high-income countries (9). PI was recognized as the fourth leading risk factor for non-communicable diseases and responsible for more than 3 million preventable deaths (10). Additionally, PI also causes economic costs. For example, ~$50 billion are spent on healthcare systems worldwide yearly, while death attributable to PI costs another $13.7 billion in productivity losses (11).
Several factors influence these results of creating inactive, sedentary community, including the development of technology, digitalization, decrees in motivation, decrease of active commuting, higher rate of depression and anxiety, to name a few. In addition, the consequence of growing levels of PI might be caused by system-level factors (e.g., built environment) influencing PA behavior. It must be recognized that our obesogenic and PI-promoting environments partly cause inactivity. One of the leading challenges of society is how to motivate people and create adherence and discipline to exercise more and change their lifestyle behaviors. Different factors can influence adherence and motivation to exercise. Interestingly increasing influence of Social networks (media) can perhaps represent the silver bullet in closing the gap between PI and PA. Recently, Lakíčević et al. (12) published an interesting opinion paper on the use of novelties as a crossroads in fitness. Although the authors of this study approached the problem from several perspectives; the role of the media, social networks, influencers, and novel fitness trends that follow the technological development of society and modern trends remains unclear. Therefore, this mini-review aims to critically evaluate the current trends in fitness their mutual impact on society, and give considerations and future directions of fitness.

SHIFTING IN FITNESS TRENDS

Since 2006, the American College of Sports Medicine (ACSM) has administered an annual worldwide survey of fitness trends (13). This is provided in a mission to help fitness professionals make conceptual decisions to support customer engagement through a positive exercise experience. Although the fitness industry is continuously growing worldwide, PI and obesity epidemics have been at the highest rate in human history (14, 15). In addition, along with the promotion of PA as a key factor in all age populations, the role of fitness experts in fitness has been rapidly and continuously changing (16). This need for novelty has been followed by shifting in fitness for the last 15 years. For example, at the beginning of the twenty-first century, PA was recognized as the ultimate medicine, and there was growing interest in physical exercise (17). Therefore, at the top of fitness trends from 2006 to 2010 we found: promotions of educated and experienced fitness professionals, training for children and obesity, personal training, strength training, among others. Later, high-intensity interval training (HIIT) attracted extensive attention, which is still one of the leading fitness trends. Finally, as mentioned previously, wearable technologies are currently the leading fitness trend and represent the future of fitness industry development.

Excluding wearable technologies, performing new and challenging workouts could increase your enjoyment and interest while enhancing new abilities. Moreover, the need for novelty may represent a need for something that stands out of the routine (18). Exercise adherence could be increased by improving intrinsic motivation, finally resulting in better health outcomes (19). Happiness’s underlying aspects fall into two dimensions: endogenic factors and exogenic factors. For the exerciser, PA must provide health benefits and emotional satisfaction. In theory, wellness can be defined as finding a balance between dimensions of life: emotional, spiritual, intellectual, physical, social, and environmental (20). Additionally, emotional wellness can be described as a “person’s ability to cope with daily circumstances and to deal with personal feelings in a positive, optimistic, and constructive manner” (21). In order to greater adherence to the exercise model, the emotional aspect must not be neglected (22) New fitness trends must incorporate physiological and psychological aspects in order to attract the attention of exercisers. And it is of key importance that fitness trends follow also technological trends.

MODERN TECHNOLOGIES IN FITNESS

Following modern trends, there are some indications that fitness and physical exercise are changing. There is a certain shift in fitness trends. Based on ACSM leading fitness trend list (13), wearable technology has been the no. 1 trend since it was first introduced on the survey in 2016, except for 2018 (no. 3) and 2021 (no. 2). In the category of wearable technologies, it can be induced all activity trackers, smartwatches, GPS devices most usually used for counting steps, tracking heart rate, calories spent, activity levels, sleeping quality, and many more. It is estimated that the market for this industry is about $100 billion, with only growing potential (13).

The use of wearable technologies has been widely tested in the last 10 years, while the results of these studies have demonstrated mixed effectiveness. Few studies evaluated the effectiveness of wearable devices on weight loss outcomes and the practice of PA. In the study by Fazzino et al., (23) a significant improvement in moderate-to-vigorous physical PA was noted after 6 months of intervention. In addition, participants maintained higher PA levels after 18 months of follow-up. Similar findings were found in the study by Chiang et al. (24) who evaluated the usage of wearable devices and adherence to PA, more precisely, step counting. After 2 years, the intervention group had statistically significantly percentage of total body weight loss compared to the control group. In addition, Findings in the population of young adults with a BMI between 25 and <40 showed that the addition of a wearable technology device to a standard behavioral intervention resulted in less weight loss over 24 months (25). Moreover, one study promised improved PA levels among medical students using the Fitbit vs. control (26). Contrary to these findings, the combination of smartwatches and health education courses did not enhance PA levels or reduce sedentary behavior among college students (27). In addition, 12 weeks of intervention with wearable technologies did not change the nutritional status or level of PA compared to the control group (28). These diverse observations mirror wearable technology randomized trials in overweight adults, the elderly population, and post-menopausal women (29–31).

One of the concerns of wearable technologies and smartwatches is their accuracy in measuring PA. This leaves room for improvement, but on the other hand, the current accuracy of the device is at a high level considering the general
population's needs. The precision in step counting and self-observed steps using wearable technologies differed slightly, while smartwatches were even more accurate [for more, see review (32)]. The accuracy of wearable technology devices can range between 79.8 and 99.1%, while the coefficient of variation (precision) ranges between 4 and 17.5% (33). Wearables' different features and technology could explain variations in the accuracy of wearable devices. The precision of activity trackers and smartwatches will grow, and innovations in the field of technology may provide us with new possibilities. The development of wearable technologies is undoubtedly one of the growing trends in fitness and can represent a strategy to increase PA among the general population.

Artificial intelligence (AI) and associated computational techniques have recently become the new frontier in developing the landscape of fitness, health care, and promotion of PA (34). For example, AI chatbots, also called virtual conversational agents, engage in conversation techniques to facilitate natural language dialogues with users employing speech, text, or both to simulate human in-person communication (35, 36). Several studies evaluated the effectiveness of AI chatbots on healthy behaviors. For example, an AI chatbot called "Assistant to Lift your Level of activityY" (Ally) increased step-goal achievement (37). However, 30% of participants dropout throughout the study, suggesting a challenge for the chatbot's capability to engage participants. Several other chatbots have shown potential to improve dietary habits (38), promote self-reflection (39), and weight management (40). However, several issues are noted in the mentioned studies. For example, there are unanswered questions about ethical concerns regarding transparency, privacy, and potential algorithmic biases. In addition, details of the development of the chatbot program were not discus in the studies. AI indeed represents the future directions in modern technologies usage in fitness, and it will be even more abundant in coming years.

THE ROLE OF SOCIAL MEDIA AND INFLUENCES ON PHYSICAL FITNESS

Social media and social networking platform usage have exponentially grown in the last 10 years. Social media can be defined as "websites and computer programs that allow people to communicate and share information on the internet using a computer or mobile phone" (41). In addition, these mediums can help promote healthier behaviors by providing users with the opportunity of learning (42). Through this type of media, YouTubers and influencers have the most influence.

A youtuber can be defined as someone who makes and appears in videos on the website, while an influencer can be defined as someone who affects or changes other people's behavior (43). Fitness is one of the topics covered by YouTube and Instagram users. Through their channels, fitness influencers describe their daily routines, give advice on exercise, diet, propose online coaching and free workouts, and generally (tik) talk about healthy lifestyles and living habits. Some youtuber influencers have millions of audiences and represent a powerful and influential medium in transmitting the information. The growing influence of Internet has its foundations in psychology as well.

Earlier media models involved passive consumers theory, where consumers simply absorb media content (44). However, later theories suggest that the media is interactive where the audience actively chooses the information to process based on their own ideas and beliefs (45). This way, the media would strengthen the ideas and behavior instead of modifying them. Internet allows viewers to choose the content according to their preferences and beliefs. Also, entertainment is an integral aspect of the individual level, so discovering innovative practices to engage in PA that children/adolescents enjoy is essential and could incorporate online PA class, performing viral dances and challenges (e.g., TikTok), or PA gaming (46). Due to these possibilities, Internet has become the leading medium in the transmission of information, especially among the younger population.

Prior research reports that higher exposure and greater attention to health in the media could lead to broader knowledge concerning a healthy lifestyle and healthier behavior (47, 48). Contrary to professional athletes, the audience senses influencers as peers and could relate to them (49), and it is this model and this determinant that has proven to be the critical factor in conveying messages (50). Through their channels, fitness influencers promote healthy lifestyle habits and PA. For example, on such channels I, coaching videos, exercise tutorials, motivational speeches, videos featuring past and current experiences of the influencer, can be regularly found (51). Following the viewer's theory of active involvement in media selections based on viewer attitudes and beliefs, it is rational to presume that viewers and followers of fitness influencers are usually interested in healthier lifestyles and fitness, so this type of content can positively impact their overall health behaviors. However, there are also negative sides to social media. For example, some studies have found the unfavorable effects of social networks on body image, body satisfaction, and eating disorders (52, 53). Moreover, it is questionable whether online sharing and promotion of PA throughout website content influences the actual PA performed (54, 55). Understanding how to use social networks and media to promote PA behaviors is limited (56). Moreover, there are limited data that evaluate the role of the influencers in promoting healthier behaviors (57).

Content designed to promote PA, healthy lifestyle habits, and a positive attitude toward fitness are likely to impact the viewer/consumer of online content positively. However, increased attention and careful consideration are advisable while using social networks and youtube channels to inspire the transition toward healthy behaviors. It is a mistake to assume that watching fitness channels can increase PA. Moreover, it could even reduce the intentions of the viewers to exercise (57).

CONCLUSION

PI was defined as a global pandemic in the 2012 Lancet series on PA and health. PI has hazardous health and economic consequences. One of the most important challenges to modern
societies is increasing awareness of PA’s importance and a healthy lifestyle. However, there is no silver bullet for PA promotion. Although many efforts have been made to promote PA, the global level of PI is still high. Therefore, it is essential to establish some goals that will follow the needs and development of modern society. On the one hand, the growing influence of influencers and social networks on the promotion of PA is a good strategy, while on the other hand, a cause for concern. The question is how to limit the influence of influencers due to the possible harmful effects of the content of their channel and the accuracy of the information itself. On the other hand, leading healthcare organizations should take the initiative and start educating fitness influencers who impact a considerable number of people, thus providing Internet users with more accurate information. In the end, the development of AI does indeed represent the future of fitness, and we will be able to assess the real benefits and consequences of these technologies in the assessments that lie ahead.

With this short review additional questions arise and need to be answered:

(1) How can wearable technologies be popularized and implemented in PA interventions worldwide?
(2) How can social networks implement PA advertising/promotion strategies at scale?
(3) How can the next wave of technological improvements such as AI be integrated into large-scale PA promotional programs.

Enhancing global health by increasing PA will demand both advancements in knowledge and a more significant commitment of resources.

**AUTHOR CONTRIBUTIONS**

VŠ, NT, and PD: conceptualization and writing–original draft preparation. MR and NT: methodology. IM, SP, MR, and NT: writing–review and editing. PD: visualization and supervision. VŠ and PD: funding acquisition. All authors have read and agreed to the published version of the manuscript.

**FUNDING**

This work was supported by the Provincial Secretariat for Higher Education and Scientific Research (142–451–2597/2021-01/2).

**REFERENCES**

1. Powell KE, Paluch AE, Blair SN. Physical activity for health: what kind? how much? how intense? on top of what? *Annu Rev Public Health.* (2011) 32:349–65. doi: 10.1146/annurev-publhealth-031210-101151
2. Thiel DM, Al Sayah F, Vallance J, Johnson ST, Johnson JA. Physical activity and health-related quality of life in adults with type 2 diabetes: results from a prospective cohort study. *J Phys Act Health.* (2017) 14:368–74. doi: 10.1123/japh.2016-0271
3. Singh NA, Clements KM, Fiatarone MA, A. randomized controlled trial of the effect of exercise on sleep. *Sleep.* (1997) 20:95–101. doi: 10.1093/slee/p20.2.95
4. Sparling PB, Howard BJ, Dunstan DW, Owen N. Recommendations for physical activity in older adults. *Bmj.* (2015) 21:350. doi: 10.1136/bmj.h100
5. World Health Organization. *Global Recommendations on Physical Activity for Health.* New York, NY: World Health Organization (2010).
6. Garber CE, Blissmer B, Deschnes MR, Franklin BA, Lamonte MJ, Lee IM, et al. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc.* (2011) 43:1334–59. doi: 10.1249/MSS.0b013e3182136efb
7. Craig HW, Lambert EV, Inoue S, Inoue S, Alkandari JR, Leetongin G, Kahlmeier P, Van Mechelen W, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 128· 9 million children, adolescents, and adults. *Lancet.* (2017) 389:2627–42. doi: 10.1016/S0140-6736(17)32129-3
8. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U. Lancet physical activity series working group: global physical activity guidelines. *Lancet.* (2016) 388:260–74. doi: 10.1016/S0140-6736(15)31314-5
9. Katzmarzyk PT, Friedenreich C, Shiroma EJ, Lee IM, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 128· 9 million children, adolescents, and adults. *Lancet.* (2017) 389:2627–42. doi: 10.1016/S0140-6736(17)32129-3
10. World Health Organization. *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks.* New York, NY: World Health Organization (2009).
11. Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, Van Mechelen W, et al. Lancet physical activity series 2 executive committee. the economic burden of physical inactivity: a global analysis of major non-communicable diseases. *Lancet.* (2016) 388:1311–24. doi: 10.1016/S0140-6736(16)30383-X
12. Lakicavic N, Gentile A, Mehrabi S, Cassar S, Parker K, Roklicer R, et al. Make fitness fun: could novelty be the key determinant for physical activity adherence? *Front Psychol.* (2020) 11:577522. doi: 10.3389/fpsyg.2020.0.577522
13. Thompson WR. Worldwide survey of fitness trends for 2022. *ACSMs Health Fit J.* (2022) 26:11–20. doi: 10.1249/FIT.0000000000000732
14. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. *Lancet Glob Health.* (2018) 6:e1077–86. doi: 10.1016/S2214-109X(18)30357-7
15. Abarca-Gómez L, Abdeen ZA, Hamid ZA, Abu-Rmeileh NM, Acosta-Cazares B, Aciun C, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128· 9 million children, adolescents, and adults. *Lancet.* (2017) 390:2627–42. doi: 10.1016/S0140-6736(17)32129-3
16. Muth ND, Vargo K, Bryant CX. The role of the fitness professional in the clinical setting. *Curr Sports Med Rep.* (2015) 14:301–12. doi: 10.1249/JSR.0000000000000174
17. Bryant CX, Peterson JA. *Exercise is Medicine.* Complementary Medicine in clinical Practice. London: Jones & Bartlett. (2006). pp.125–30.
18. González-Cutre D, Romero-Elías M, Jiménez-Loaisa A, Beltrán-Carrillo VJ, Hagger MS. Testing the need for novelty as a candidate need in basic psychological needs theory. *Motiv Emot.* (2020) 44:295–314. doi: 10.1007/s11031-019-09812-7
19. Robison J, Rogers MA. Adherence to exercise programmes. *Sports Med.* (1994) 17:39–52. doi: 10.2165/00007256-199417010-00004
20. Erickson MS. Restorative garden design: Enhancing wellness through healing spaces. *J Art Design.* (2012) 2:89–101. doi: 10.29727/JAD.201206.0007
21. Corbin CB. *Concepts of Fitness and Wellness: A Comprehensive Lifestyle Approach.* New York, NY: McGraw Hill. (2009).
22. Calleja-González J, Terrados N, Martín-Acero R, Lago-Peñas C, Jukic I, Mielgo-Ayuso J. Happiness vs. wellness during the recovery process in high performance sport. *Front Physiol.* (2018) 9:1598. doi: 10.3389/fphys.2018.01598

23. Fazzino TL, Fabian C, Befort CA. Change in physical activity during a weight management intervention for breast cancer survivors: association with weight outcomes. *Obesity.* (2017) 25:S109–15. doi: 10.1002/oby.22007

24. Chiang AL, Jirapinyo P, Thompson CC. Potential impact of wearable technology as part of a multidisciplinary treatment strategy for weight regain following roux-en-y gastric bypass. *Gastroenterology.* (2017) 152:S1016–7. doi: 10.1016/S0016-5085(17)33445-5

25. Jakicic JM, Davis KK, Rogers RJ, King WC, Marcus MD, Helsel D, et al. Effect of wearable technology combined with a lifestyle intervention on Long-Term weight loss: the IDEA randomized clinical trial. *Obstet Gynecol Surv.* (2017) 72:67–8. doi: 10.1097/OGS.0000000000001237.67 520.49

26. Thorndike AN, Mills S, Sonnenberg L, Palakshappa D, Gao T, Pau CT. Activity monitor intervention to promote physical activity of physicians-in-training: randomized controlled trial. *PLoS One.* (2014) 9:e100251. doi: 10.1371/journal.pone.0100251

27. Kim Y, Lumpkin A, Lochbaum M, Stegemeier S, Kitten K. Promoting physical activity using a wearable activity tracker in college students: A cluster randomized controlled trial. *J Sports Sci.* (2018) 36:1889–96. doi: 10.1080/02640414.2018.1423886

28. Pope ZC, Barr-Anderson DJ, Lewis BA, Pereira MA, Gao Z. Use of wearable technology and social media to improve physical activity and dietary behaviors among college students: A 12-week randomized pilot study. *Int J Environ Res. (2019)* 16:3579. doi: 10.3390/ijerph16193579

29. Wang JB, Cadmus-Bertram LA, Natarajan L, White MM, Madanat H, Nichols JF, et al. Wearable sensor/device (Fitbit One) and SMS text-messaging prompts to increase physical activity in overweight and obese adults: a randomized controlled trial. *Telemed J E Health.* (2015) 21:782–92. doi: 10.1089/tmj.2014.0176

30. Thompson WG, Kuhle CL, Koepf GA, McCrady-Spitzen SK, Levine JA. “GotLife” exercise counseling, accelerometer feedback, and activity levels in older people. *Arch Gerontol Geriatr.* (2014) 58:314–9. doi: 10.1016/j.archger.2014.01.004

31. Cadmus-Bertram LA, Marcus BH, Patterson RE, Parker BA, Morey BL. Randomized trial of a Fitbit-based physical activity intervention for women. *Am J Prev Med.* (2015) 49:414–8. doi: 10.J.amjpre.2015.01.020

32. Case MA, Burwick HA, Volpp KG, Patel MS. Accuracy of smartphone applications and wearable devices for tracking physical activity data. *Jama.* (2015) 313:625–6. doi: 10.1001/jama.2014.17841

33. Amrery, F, Noussou MI. Are currently available wearable devices for activity tracking and heart rate monitoring accurate, precise, and medically beneficial? *Healthc Inform Res.* (2015) 21:315–20. doi: 10.4258/hir.2015.21.4.315

34. Walsh CG, Chaudhry B, Dua P, Goodman KW, Kaplan B, Kavuluru R, et al. Stigma, biomarkers, and algorithmic bias: recommendations for precision behavioral health with artificial intelligence. *JAMIA open.* (2020) 3:9–15. doi: 10.1093/jamiaopen/ozz057

35. Laranjo L, Dunn AG, Tong HL, Kocaballi AB, Chen J, Bashir R, et al. Conversational agents in healthcare: a systematic review. *J Med Internet Res.* (2014) 16:e15085. doi: 10.2196/15085

36. Zhang J, Oh YJ, Lange P, Yu Z, Fukuoka Y. Artificial intelligence chatbot app to promote stair-climbing habits among office workers: exploratory randomized controlled trial. *JMIR mHealth and uHealth.* (2020) 8:e15085. doi: 10.2196/15085

37. Kocielnik R, Xiao L, Avrahami D, Hsieh G. Reflection companion: a conversational system for engaging users in reflection on physical activity. *Proc ACM Interact Mob Wearable Ubiquitous Technol.* (2018) 2:1–26. doi: 10.1145/3214273

38. Piao M, Ryu H, Lee H, Kim J. Use of the healthy lifestyle coaching chatbot app to promote stair-climbing habits among office workers: exploratory randomized controlled trial. *JMIR mHealth and uHealth.* (2020) 8:e15085. doi: 10.2196/15085

39. Cambridge Dictionary Definition: Social Media. Available online at: https://dictionary.cambridge.org/dictionary/english/social-media (accessed February 14, 2022).

40. Vaterlaus JM, Patton EV, Roche C, Young JA. # Gettinghealthy: the perceived influence of social media on young adult health behaviors. *Comput Hum Behav.* (2015) 45:151–7. doi: 10.1016/j.chb.201 4.12.013

41. Cambridge Dictionary Definition: Influencer. Available online at: https://dictionary.cambridge.org/dictionary/english/influencer (accessed February 14, 2022).

42. De Fleur ML, A. mass communication model of stimulus response relationships: an experiment in leaflet message diffusion. *Sociometry.* (1956) 19:12–25. doi: 10.2307/2786100

43. Seaman WR. Active audience theory: pointless populism. *Media Cult Soc.* (1992) 14:301–11. doi: 10.1177/016343920014002010

44. Bates LC, Zief G, Stanford K, Moore JB, Kerr ZY, Hanson ED, et al. COVID-19 impact on behaviors across the 24-h day in children and adolescents: physical activity, sedentary behavior, and sleep. *Children.* (2020) 7:138. doi: 10.3390/children/7090138

45. Tian Y, Robinson JD. Incidental health information use on the internet. *Health Commun.* (2009) 24:41–9. doi: 10.1080/1041023080266984

46. Rilind R, Rodriguez L. The influence of antibesity media content on intention to eat healthily and exercise: a test of the ordered protection motivation theory. *J Obes.* (2014) 2014:1–10. doi: 10.1155/2014/ 954784

47. Collardner J, Dahlen M. Following the fashionable friend: the power of social media: Weighing publicity effectiveness of blogs versus online magazines. *J Advert Res.* (2011) 51:313–20. doi: 10.2501/JAR-5 1-1-313-320

48. Andsager JL, Bemker V, Choi HL, Torwel V. Perceived similarity of exemplar traits and behavior: effects on message evaluation. *Commun Res.* (2006) 33:3–18. doi: 10.1177/0093630205283099

49. Sokolova K, Perez C. You follow fitness influencers on youtube. but do you actually exercise? how parasocial relationships, and watching fitness influencers, relate to intentions to exercise. *J Retail Consum Serv.* (2021) 58:102276. doi: 10.1016/j.jretconser.2020.102276

50. Groesz LM, Levine MP, Murnen SK. The effect of experimental presentation of thin media images on body satisfaction: a meta-analytic review. *Int J Eat Disord.* (2002) 31:1–6. doi: 10.1002/eat.10005

51. Bair CE, Kelly NR, Serdar KL, Mazzeo SE. Does the Internet function like magazines? an exploration of image-focused media, eating pathology, and body dissatisfaction. *Eat Behav.* (2012) 13:398–401. doi: 10.1016/j.eatbeh.2012.06.003

52. Zhou X, Krishnan A. What predicts exercise maintenance and well-being? examining the influence of health-related psychographic factors and social media communication. *Health Commun.* (2019) 34:589–97. doi: 10.1080/10410236.2018.1428851

53. Williams G, Hamm MP, Shulhan J, Vandermeer B, Hartling L. Social media interventions for diet and exercise behaviours: a systematic review and meta-analysis of randomised controlled trials. *BMJ Open.* (2014) 4:e003926. doi: 10.1136/bmjopen-2013-003926

54. Tate DE, Lyons EL, Valle CG. High-tech tools for exercise motivation: use and role of technologies such as the internet, mobile applications, social media, and video games. *Diabetes Spectr.* (2015) 28:45–54. doi: 10.2337/diaspect.28.1.45
its influence on health and wellbeing. *BMC Public Health.* (2018) 18:1–1. doi: 10.1186/s12889-018-5930-7

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Publisher’s Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

*Copyright © 2022 Štajer, Milovanović, Todorović, Ranisavljev, Pilot and Drid. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.*