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Affective and Motivational Mechanisms in Striving for Identity Goals.

Doctoral dissertation written under the supervision of

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Abstract (in English)

The objective of this research was to explore unexamined so far aspects of striving for identity goals, that is affective and motivational context of compensatory behaviors and the experience of (in)completeness states. I[1] focused on experience of regret in compensatory health behaviors after acting inconsistently with an important goal, sequential self-symbolizing while facing hedonic temptations opposing identity goal, and preference for instrumental symbols in the (in)completeness states. This dissertation presents a series of two published articles and one manuscript in preparation, including seven studies with a common thematic core being compensatory behaviors in identity goal striving. My studies included explorations in the area of three different identity goals i.e., being healthy, being eco-friendly and being physically active.

My first publication focuses on affective mechanisms of compensation. Within this article I conducted one longitudinal study with a sample of 185 participants committed to the goal of being healthy. The aim of this study was to test a model in which the relationship between acting inconsistently with an important goal and compensatory health behaviors is mediated by regret. Additionally, I tested whether inconsistency with the goal will cause higher regret when individuals perceive a given situation as inhibiting their goal pursuit and whether experienced regret will be more intense among individuals who find the goal more important. Results showed that acting inconsistently with an important goal was associated with higher levels of experienced regret which, in turn, predicted engagement in compensatory health behaviors. Importantly, I showed that not only regret related to a certain behavior, such as eating a piece of cake, but regret related to being involved in a certain situation, led to compensation. Moreover, this study also showed that inconsistency with the

[1] Throughout the work I use the first-person singular form because I am the author of this doctoral dissertation. It is important to emphasize, however, that all studies were created as a team effort and all co-authors contributed to the articles described.

goal had a significant effect on perceived goal inhibition, which led to a higher level of regret and undertaking compensatory behaviors. Finally, I found that the importance of the goal moderated the effect of acting inconsistently with the goal on regret.

In the second publication I focused on the (in)completeness states and refraining from temptations. I tested the effect of (in)completeness for a series of choices, exploring the sequential nature of compensation. Within this article I carried out two studies including samples of vegans committed to environmental protection (N = 531). The aim of this research was to test whether inducing a state of self-incompleteness among vegans committed to environmental protection results in abstaining from attractive, hedonic, but not ecological dishes. I tested these effects in a series of three choices in order to explore if a single compensatory action is sufficient for restoring a sense of completeness. I measured post-decisional regret as well, and further verified these effects controlling for individual differences, such as self-control and the pursuit of pleasure. I found that the experience of incompleteness led to less frequent temptation choices inconsistent with the aspired-to identity goal. This effect appeared only for the first choice and further diminished. Results of post-decisional regret were not found consistent across two studies but suggested that perceived conflict between the self-defining goal and pursuing a hedonic goal, appearing in a form of higher experience of regret after the choice of temptation, is the most apparent at the first occasion. There was no significant effect of the self-control trait, but the pursuit of pleasure was associated with more frequent temptation choices.

The third article, attached in my dissertation as a manuscript, studies the preference for instrumental symbols in the (in)completeness states. Within this line of research, I conducted four studies including samples of runners engaged in undertaking physical activity (N = 625). This research aimed to examine whether the experience of incompleteness contributes to the choice of symbols more instrumental for an important goal. Moreover, I tested whether

perceived effort of using more and less instrumental symbols is concurrent with instrumentality. Finally, I tested whether the effect of self-(in)completeness manipulation on choice of symbol will be qualified by social reality. Results showed that the experience of incompleteness conduced to more frequent choice of instrumental symbol than the experience of completeness. This effect was consistent across all studies despite use of different self-(in)completeness manipulations and symbols. Perceived effort required for using symbols was found to be concurrent with instrumentality. The social reality manipulation was not a significant moderator of the symbol choice.

The series of articles presented in my dissertation expands previous findings regarding consequences of failures and success in striving for goals. Studies conducted explore various theoretical constructs such as goal pursuit, compensation, self-regulation, goal conflict, self-completion and instrumentality in new context. I showed that regret over being in a situation that inhibits goal pursuit lays at the roots of compensatory behaviors, that the effect of incompleteness on refraining from giving in to temptations is short lasting and that the experience of incompleteness directs choices towards symbols more instrumental for an aspired-to identity goal. I propose new avenues for future research in areas of affective aspects of compensation, self-symbolization in a situation of facing temptation and the instrumentality of symbols.

*Keywords***:** self-(in)completion, self-symbolization, identity goals, compensation, regret, instrumentality

Abstrakt (in Polish)

Celem poniższych badań była eksploracja niebadanych dotychczas aspektów dążenia do celów tożsamościowych, takich jak afektywny i motywacyjny kontekst zachowań kompensacyjnych oraz doświadczenia (nie)dopełnienia ja. Skoncentrowałam się[2] na doświadczaniu żalu w kompensacyjnych zachowaniach zdrowotnych po działaniu niezgodnym z ważnym celem, sekwencyjnym symbolizowaniu w obliczu hedonicznych pokus przeciwstawnych celowi tożsamościowemu oraz preferencjach do symboli instrumentalnych w stanach (nie)dopełnienia ja. Niniejsza rozprawa przedstawia serię dwóch opublikowanych artykułów i jednego manuskryptu zawierających łącznie siedem badań, których wspólnym rdzeniem tematycznym są zachowania kompensacyjne w dążeniu do celu tożsamościowego. Moje badania obejmowały eksploracje w obszarze trzech różnych celów tożsamościowych, takich jak bycie zdrowym, bycie przyjaznym dla środowiska oraz bycie aktywnym fizycznie.

Moja pierwsza publikacja dotyczy afektywnych mechanizmów kompensacji. W ramach tego artykułu przeprowadziłam jedno badanie podłużne z próbą 185 uczestników, zaangażowanych w realizację celu bycia zdrowym. Celem tego badania było przetestowanie modelu, w którym związek między działaniem niezgodnym z ważnym celem a kompensacyjnymi zachowaniami zdrowotnymi jest zapośredniczony przez żal. Dodatkowo sprawdziłam, czy niezgodność z celem będzie powodowała większy żal, gdy osoby postrzegają daną sytuację jako hamującą dążenie do celu oraz czy odczuwany żal będzie bardziej intensywny u osób, dla których cel jest ważniejszy. Wyniki pokazały, że działanie niezgodne z ważnym celem wiązało się z wyższym poziomem doświadczanego żalu, co z kolei przewidywało zaangażowanie w kompensacyjne zachowania zdrowotne. Co ważne,

[2] W całej pracy posługuję się formą pierwszoosobową, ponieważ jestem autorem niniejszej rozprawy doktorskiej. Należy jednak podkreślić, że wszystkie badania powstały w pracy zespołowej, a wszyscy współautorzy przyczynili się do powstania opisanych artykułów.

pokazałam, że nie tylko żal związany z pewnym zachowaniem, np., zjedzeniem kawałka ciasta, ale żal związany z zaangażowaniem w daną sytuację, prowadziło do kompensacji. Ponadto badanie to wykazało również, że niezgodność z celem miała istotny wpływ na postrzegane zahamowanie celu, co prowadziło do wyższego poziomu żalu i podejmowania zachowań kompensacyjnych. Ostatecznie zauważyłam, że ważność celu moderowała efekt działania niezgodnego z celem na żal.

W drugiej publikacji skupiłam się na stanach (nie)dopełnienia ja oraz powstrzymywaniu się od pokus. Przetestowałam efekt (nie)dopełnienia ja w serii wyborów, badając sekwencyjny charakter kompensacji. W ramach tego artykułu przeprowadziłam dwa badania obejmujące próby wegan zaangażowanych w ochronę środowiska (N = 531). Celem tych badań było sprawdzenie czy wywołanie stanu niedopełnienia ja wśród wegan zaangażowanych w ochronę środowiska skutkuje powstrzymanie się od atrakcyjnych, hedonicznych, ale nie ekologicznych potraw. Testowałam te efekty w serii trzech wyborów, aby zbadać, czy pojedyncze zachowanie kompensacyjne wystarcza do przywrócenia stanu dopełnienia ja. Zmierzyłam również żal podecyzyjny i dalej zweryfikowałem te efekty, kontrolując różnice indywidualne, takie jak samokontrola i dążenie do przyjemności. Zauważyłam, że doświadczenie niedopełnienia ja prowadziło do rzadszych wyborów pokusy niezgodnej z celem tożsamościowym. Efekt ten był istotny tylko dla pierwszego wyboru, a następnie osłabiał się. Wyniki dotyczące żalu po podjęciu decyzji nie były spójne w obu badaniach, ale sugerowały, że postrzegany konflikt między samookreślającym celem a dążeniem do celu hedonicznego, zauważalny w postaci wyższego doświadczenia żalu po wyborze pokusy, jest najbardziej widoczny przy pierwszej okazji. Nie stwierdzono istotnego efektu dla cechy samokontroli, ale dążenie do przyjemności wiązało się z częstszymi wyborami pokus.

Trzeci artykuł, załączony w mojej rozprawie w formie manuskryptu, bada preferencje symboli instrumentalnych w stanach (nie)dopełnienia ja. W ramach tej pracy przeprowadziłam cztery badania obejmujące próby biegaczy zaangażowanych w podejmowanie aktywności fizycznej (N = 625). Badania te miały na celu sprawdzenie czy doświadczenie niedopełnienia ja przyczynia się do wyboru symboli bardziej instrumentalnych dla ważnego celu. Ponadto przetestowałam, czy postrzegane zaangażowanie wysiłku wymaganego do używania mniej lub bardziej instrumentalnych symboli współwystępuje z instrumentalnością. Na koniec sprawdziłam, czy efekt manipulacji stanem (nie)dopełnienia ja na wybór symbolu będzie warunkowany przez rzeczywistość społeczną. Wyniki pokazały, że doświadczenie niedopełnienia ja sprzyjało częstszemu wybieraniu symbolu instrumentalnego niż doświadczenie dopełnienia ja. Efekt ten był spójny we wszystkich badaniach pomimo stosowania różnych manipulacji stanem (nie)dopełnienia ja i rodzajów symboli. Postrzegany wysiłek potrzebny do używania symboli okazał się zbieżny z instrumentalnością. Manipulacja rzeczywistością społeczną nie była istotnym moderatorem wyboru symboli.

Przedstawiony w mojej rozprawie cykl artykułów rozwija dotychczasowe odkrycia dotyczące konsekwencji porażek i sukcesów w dążeniu do celów. Przeprowadzone badania eksplorują różne konstrukty teoretyczne, takie jak dążenie do celu, kompensacja, samoregulacja, konflikt celów, (nie)dopełnienie ja i instrumentalność w nowym kontekście. Wykazałam, że żal wynikający ze znalezienia się w sytuacji, która hamuje dążenie do celu, stoi za zachowaniami kompensacyjnymi, że efekt niedopełnienia ja na powstrzymywanie się od ulegania pokusom jest krótkotrwały oraz że doświadczenie niedopełnienia ja kieruje wybory w stronę symboli bardziej instrumentalnych dla celu tożsamościowego. Proponuję nowe kierunki przyszłych badań w obszarach afektywnych aspektów kompensacji, symbolizacji w sytuacji stawiania czoła pokusie oraz instrumentalności symboli.

*Słowa kluczowe***:** dopełnienie, symbolizacja, cele tożsamościowe, kompensacja, żal, instrumentalność

Chapter 1: Theoretical introduction

People pursue a variety of goals during their life time. Some of these goals may have a clearly defined end-state, e.g., graduation of dream studies crowned with a diploma or starting a family by getting married. Except these goals with clear moment of achievement, there are other particularly important goals, central to the understanding of identity that can never be fully attained, such as being a healthy or an eco-friendly person. Striving for these, so-called identity goals, requires engagement in self-symbolizing activities, i.e., behaviors that indicate achievements regarding a dream identity (Gollwitzer et al., 1982; Gollwitzer, 2018; Wicklund & Gollwitzer, 1981). Being involved in any of activities pertinent to an important goal indicates a long-range commitment which is crucial in striving for self-defining goals (Wicklund & Gollwitzer, 1981). Commitment to goals is associated with a strong sense of determination, tendency to adhere to a focal goal, unwillingness to abandon or lower the original goal, and willingness to invest effort (Hollenbeck & Klein, 1987; Kruglanski et al., 2002; Nenkov & Gollwitzer, 2012; Oettingen, Pak, & Schnetter, 2001; Shah et al., 2002). Goal commitment may express itself in enhanced goal strivings and is connected with employment of symbols (Kruglanski et al., 2002; Wicklund & Gollwitzer, 1982).

Symbols as indicators of possessing an aspired-to self-definition can take variety of forms e.g., titles, professions, self-descriptions, job positions, behaviors or membership in selected interest groups (Gollwitzer et al., 1982; Wicklund & Gollwitzer, 1981). As “building blocks of a person’s self-identity embedded in a social context” (Wicklund & Gollwitzer, 1982, p. IX), symbols also differ in their “noticeable obviousness”. Symbols can self-evidently manifest themselves in apparent activities, such as using a Greenpeace-branded carrier bag, but they may also be more subtle, such as a relevant positive self-description (Marquardt et al., 2016) or an expressed behavioral intention (Gollwitzer et al., 2009). Additionally, from the whole spectrum of symbols from which individuals may choose to

strive for a goal, some of them may appear more instrumental for a goal, that is more effective in attaining this goal (Labroo & Kim, 2009). According to the goal-systems theory, activities aimed at accomplishing the goal, differ in their instrumentality (or subjective utility) which depends on many factors such as expectancy of attainment, circumstances, expenditure of effort, or commitment (Kruglanski et al., 2002).

The path to achieve goals is not always straightforward and is often associated with encountering obstacles. Individuals experience desires almost half the time they are active, and desires turn into temptations when they remain in conflict with an important aspired-to goal (Hofmann et al., 2012). Failing short of symbols and experiencing failures, such as acting inconsistently with an important goal, may highlight discrepancy between the current and the desired end-state and result in experiencing unpleasant tension (Higgins, 1987; Moskowitz & Gesundheit, 2009; Rabiau et al., 2006). This tension, in turn, triggers compensatory responses such as self-symbolizing activities (Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Sorys et al., in press; Wicklund & Gollwitzer, 1981; 1982). Importantly, the mechanism behind compensatory behaviors is grounded in affect (Higgins, 1989; Rabiau et al., 2006).

In my work I focused on identity goals and explored new theoretical areas of compensation. So far, the role of regret in compensation has not been widely explored. My study tested regret and the dynamic of compensation in the context of avoiding unhealthy snacks. Moreover, I filled the research gap by examining whether the behavioral consequences of experiencing incompleteness and completeness affect the resolution of goal conflicts. Finally, I presented the new avenue in research on self-(in)completeness states by examining preference for instrumental symbols.

Affective Mechanisms of Compensation

Goal striving is compensatory and self-regulatory in nature (Kruglanski et al., 2002; Mahler, 1993; Moskowitz & Gesundheit, 2009; Wicklund & Gollwitzer, 1982). The self-completion theory presents compensation as engagement of efforts in self-symbolization coming from disruption in striving for self-defining goal and emphasizes that compensation is far more likely for individuals that are highly committed to an important goal (Wicklund & Gollwitzer, 1981). The compensatory health beliefs model (Rabiau et al., 2006) focuses on the temporal aspect of goal pursuit. The motivational conflict between long-term goals and strong desires for immediate gratification increases tension and leads to compensation. To resist temptation, individuals can use mechanisms of self-regulation as an internal mechanism of goal conflict resolution (Baumeister, 2002; Baumeister et al., 2018; Kruglanski et al., 2002). When individuals face a temptation that conflicts with their important goal, they might begin to form compensatory beliefs or compensatory intentions to minimize unpleasant tension (Kronick & Knäuper, 2010). This may result in compensatory behaviors when self-efficacy required for the goal strive is enhanced (Lippke et al., 2009). Compensatory health behaviors are undertaken to neutralize or compensate for the negative effect of previously undertaken unhealthy behaviors (Rabiau et al., 2006). Similarly, after acting inconsistently with the goal, individuals undertake self-symbolizing compensatory behaviors (Moskowitz & Gesundheit, 2009).

Affective mechanism behind compensatory actions was suggested to be grounded in the experience of guilt after acting inconsistently with the goal (Rabiau et al., 2006). Ginner-Sorolla (2001) showed that high level of self-conscious negative affect, including emotions like guilt or regret, is associated with higher self-control in long-term goals. The research on affective mechanism behind compensatory actions was focused on guilt and little attention was paid to regret. Although the two emotions are sometimes invoked simultaneously, they

have distinct characteristics important in compensatory processes. Guilt is a more social and interpersonal feeling and often arises as a result of violating some moral standards (Zeelenberg & Breugelmans, 2008). Regret, however, arises as a consequence of violating personal standards or experiencing an outcome that conflicts with expectations. Experiencing regret stems from realizing that a given person would have been better if he or she had acted differently (Zeelenberg & Pieters, 2007). Importantly, a sense of personal agency is crucial for the experience of regret to occur (Zeelenberg et al., 2001; Zeelenberg & Pieters, 2004b; Zeelenberg et al., 1998a). The experience of regret is an important emotion in regard to affective mechanisms of compensation since it arises when individuals fail to find an optimal balance between fulfilling immediate desires and meeting long-term goals (Conner et al., 2006; Gilovich & Medvec, 1994; 1995). So far, experience of regret after a failure to exercise was found to boost compensatory behaviors e.g., walking, and reduce level of involvement in socialization (Byrka et al., 2018; Byrka et al., 2020). Moreover, acting inconsistently with an important goal of academic achievement was found to manifest itself in feelings of regret (Valshtein & Seta, 2019).

Regret is a product of an unfavorable assessment of a decision, and it leads to a strong desire to undo the decision (Zeelenberg & Pieters, 2007). As such, it is a powerful factor giving directions for future behaviors and triggering compensatory actions. The experience of regret resulting from dissatisfaction with a current service provider motivates to make a decision of changing it (Zeelenberg & Pieters, 2004a). Regret was found to be strongly unpleasant and the more intense the experienced regret is, the stronger it prompts individuals to undertake actions. Individuals have a need to undo a regrettable action as soon as possible, to the extend where they prefer to undertake behavior minimizing their regret within not more than a day after the regrettable event (Zeelenberg et al., 1998b). Investment of effort in achieving a goal leads to experiencing more regret after a failure in goal pursuit (Van Dijk et

al., 1999). The experience of regret is so aversive that even hypothetical consideration of it motivates people to act in order to avoid negative affect (Sheeran & Orbell, 1999). Anticipated regret experienced as a result of imagining failure to act according to one's intentions was found to predict undertaking health behaviors (Abraham & Sheeran, 2003) and refraining from risky sexual behaviors (Richard et al., 1998). Anticipation of experience of regret after yielding to temptation indicates a conflict with an important goal (Vosgerau et al., 2020).

Self-incompleteness and Refraining from Temptations

People can compensate as a consequence of encountering a temptation. Identity goals, like any other goal, often stay in conflict with competing goals, including the pursuit of pleasure and comfort (Lindenberg & Steg, 2007; Vosgerau et al., 2020; Inzlicht et al., 2020). Hedonic goals are driven by the desire for pleasure and the fulfillment of desires (Hofmann & Van Dillen, 2012; Stroebe et al., 2008), which is written in human nature (Berridge & Aldridge, 2008; Young, 1952). Arising temptations may serve as means to attain hedonic goals and at the same time, they may interfere with strive for self-defining goals (e.g., Giner-Sorolla, 2001). People employ various self-regulatory strategies, that is mental and behavioral activities that facilitate the pursuit and allow for the attainment of aspired-to goals (Carver & Scheier, 2001; Kuhl, 2018), such as resisting temptations to avoid or resolve goal conflicts (Inzlicht et al., 2020; Kruglanski et al., 2002). Importantly, individuals perceive succumbing to temptations only when it violates a superordinate, long-term goal that is important to them and to which they are committed (Fishbach & Shah, 2006; Vosgerau et al., 2020).

According to self-completion theory, individuals may experience states of completeness or incompleteness while striving for identity goals. The state of completeness appears with a feeling that the desired identity has been reached, and as a result, individuals no longer experience an urge to strive for the identity goal (Gollwitzer et al., 2009).

Conviction about acquiring the characteristics that indicate the possession of the aspired-to identity, makes individuals less likely to engage in further self-symbolizing activities (Gollwitzer, 2018). Shortage of self-symbols, as acting inconsistently with the goal or interruption in goal striving, leads to the state of incompleteness. This state comes from individuals learning about their behaviors distancing them from aspired-to identity. In contrast to completeness, the state of incompleteness results in an unpleasant tension that needs to be reduced, and to do this, individuals undertake self-symbolizing activities as a means of compensation aimed at restoring completeness (Gollwitzer et al., 1982; Gollwitzer & Wicklund, 1985; Gollwitzer, 2018; Lalot et al., 2019; Moskowitz et al., 2011; Susewind & Walkowitz, 2020).

Longoni et al. (2014) showed that environmentally conscious participants who experienced incompleteness as a result of receiving negative feedback about their non-ecological consumer choices, were striving to achieve the identity goal of protecting the environment more intensively by segregating waste more carefully. On the other hand, environmentally conscious participants who experienced completeness as a result of receiving favorable feedback on the environmental friendliness of their consumer choices, reduced the pursuit of their self-defining goal and therefore recycled waste less carefully. Experience of incompleteness was also found to inhibit strive for alternative goals. Incomplete students with the identity goal of being a successful lawyer, endorsed immoral behaviors as long as these were seen as indicative of being a skillful lawyer, overriding the pursuit of being a moral person (Marquardt et al., 2016).

Sciara et al. (2022) showed the effect of incompleteness in context of sequential self-symbolizing. A single post of carrier-relevant information on social media, by individuals with the identity goal of becoming a physician, was sufficient to decrease an urge for further self-symbolization. A state of incompleteness led to self-symbolization on the first occasion

but in subsequent occasions self-symbolization became less likely, which indicates that incompleteness effects are short-lived. Since temptations rarely occur in isolation and individuals often have to make a series of choices in a row, this effect of incompleteness is relevant in context of resisting multiple temptations and sequential self-symbolizing.

Individuals differ in their ability to resolve goal conflicts (Duckworth et al., 2011; Duckworth et al., 2016). Baumeister (2002) and Tangney et al. (2004) suggest that high self-control is responsible for showing self-discipline in the face of temptations and distractions. Individuals high in the trait of self-control were found to be better at shielding long-term goals from the pursuit of conflicting hedonic goals by resisting temptations, inhibiting or altering impulses, and overriding undesired behavioral tendencies (Baumeister, 2002; Baumeister et al., 2007; Hofmann et al., 2012; Milyavskaya et al., 2015; Vosgerau et al., 2020). Higher self-control was found to be related to better impulse control, for instance, more successful diet regulation or the absence of alcohol abuse patterns (Hofmann et al., 2012; Tangney et al., 2004).

Self-incompleteness and Preference for Instrumental Symbols

Despite solid evidence on individuals' urge for self-symbolizing in self-(in)completeness states, it is not known whether individuals differentiate symbols in the extent to which they allow them for the accomplishment of identity goals i.e., their instrumentality. Symbols, as activities undertaken to strive for a goal, may be compared to means which are tools used by individuals to pursue their goals, according to the theory of goal systems (Kruglanski et al., 2002). Symbols compared to means are way more figurative and subtle. Even a single expression of intention, as self-symbolization, may be sufficient for rebuilding the state of completeness (Gollwitzer et al., 2009). Means are more concrete and tangible, understood as any activities perceived as contributory to the attainment of the goal (Shah & Kruglanski, 2003).

In comparison to the theory of goal systems, the theory of symbolic self-completion highlights the importance of social reality in striving for self-definitions. Symbols represent a meaning which sets off a universal reaction in others e.g., wearing a symbolic running shoes communicates to others that physical activity is an important part of individual's identity (Wicklund & Gollwitzer, 1982). Past research has shown that individuals committed to an identity goal self-symbolize less as a result of other people taking notice of their behavioral intentions, which indicates that social reality fosters the state of completeness (Gollwitzer et al., 2009).

To maximize the goal attainment, individuals tend to choose more instrumental means. According to the goals systems theory, means which give the greatest expectancy of attainment are most likely to be chosen (Kruglanski et al., 2002). Moreover, more effortful means appear more instrumental and effective in attaining a goal (Labroo & Kim, 2009) and add value to these goals (Inzlicht et al., 2018). According to "instrumentality heuristic", difficult experience may be judged positively if it helps to achieve a particular goal (Labroo & Kim, 2009). From the other hand, mostly desirable means are the one requiring the least effort (Schwarz, 2004). Effort being complexed in nature is called a paradox, based on being costly from one side and adding value from the other one (Inzlicht et al., 2018).

Studies by Labroo and Kim (2009) showed that the chocolate ad that was difficult to read was perceived by participants as more instrumental for goal of gaining pleasure, than the ad that was easy to process. Similarly, unpleasant mean i.e., a bitter-flavored substance, was perceived as less enjoyable and more instrumental for avoidance goal such as preventing obesity (Hennecke et al., 2019). In another study, the more pain participants experienced during getting a tattoo, the more instrumental this activity was perceived for their idiosyncratic focal goal. Moreover, mouthwash perceived as causing painful burning sensation was found to be connected with higher perception of instrumentality for the goal of

preventing sore throat (Schumpe et al., 2018). This suggests that individuals form positive perceptions of complexity if they assess means as challenging and worth pursuing.

Objectives

The research presented in my dissertation examine affective aspects of compensation (Chapter 2), sequential self-symbolization in a situation of facing temptation (Chapter 3), and the instrumentality of symbols (Chapter 4). Chapter 2 consists of Study 2.1, Chapter 3 consists of Study 3.1 and Study 3.2, and Chapter 4 consists of Study 4.1, Study 4.2, Study 4.3 and Study 4.4.

In Study 2.1, I verified whether undertaking a behavior inconsistent with an important goal leads to the experience of regret and, consequently, to the compensatory avoidance of behavior inconsistent with this goal. In Studies 3.1 and 3.2, I examined whether the experience of incompleteness results in refraining from temptations that allow a realization of a hedonic goal. I tested these effects in a series of choices, exploring the sequential nature of compensation. In Studies 4.1 - 4.4, I tested the preference for instrumental symbols in the (in)completeness states. I explored whether the experience of incompleteness contributes to the choice of symbols more instrumental for an important goal. In addition, I examined whether perceived engagement of effort required for using symbols is concurrent with instrumentality. Finally, I tested whether the effect of self-(in)completeness manipulation on choice of symbol is qualified by social reality.

In particular, the objectives of the research were to:

1. Explore the role of experience of regret in regulation of compensation.
2. Examine whether the state of self-incompleteness in an important goal makes individuals to refrain from temptations.
3. Test whether the state of self-incompleteness leads to the choice of symbols more instrumental for an identity goal.

Ethical issues

I paid a particular attention to ethical aspects of my research and obtained the approval of the SWPS University of Social Sciences and Humanities Faculty's Ethics Committee for the research, in accordance with the Declaration of Helsinki. The Ethical Review Board of the first author's institution approved the experimental procedure used in Study 2.1 (Decision 02/ P/10/2018), Study 3.1 and Study 3.2 (Decision 03/P/01/2020), and Study 4.1, Study 4.2, Study 4.3 and Study 4.4 (Decision 12/P/04/2022). Study 3.2, Study 4.3 and Study 4.4 were pre-registered. All studies' participants gave their informed consent. The research was confidential and only the person conducting the project had access to personal data. The data was analyzed and described only collectively.

Chapter 2: Affective Mechanisms of Compensation

Publication: Sorys, K., & Byrka, K. (2021). Acting inconsistently with an important goal predicts compensatory health behaviors through regret. *Appetite, 163*, 105217. https://doi.org/10.1016/j.appet.2021.105217, *IF* = 5.016.

Study 2.1

Study 2.1 examined affective mechanisms of compensatory health behaviors after acting inconsistently with an important goal. The aim of this study was to test a model in which the relationship between failure to act consistently with a healthy goal and compensatory health behaviors is mediated by regret over being involved in a situation inconsistent with an important goal. Firstly, I hypothesized that health-conscious participants acting inconsistently with an important goal will experience more regret compared to participants acting consistently. It was expected as well that acting inconsistently with an important goal will result in engagement in compensatory health behaviors through regret. Moreover, I expected that inconsistency will cause higher regret when individuals perceive a given situation as inhibiting their goal pursuit and that experienced regret will be more intense among individuals who find the goal more important. Finally, it was predicted that regret should be more intense among individuals who find a certain goal important to them. Therefore, I hypothesized that a subjective goal importance will moderate the relation between inconsistency with that goal and regret, in such a way that participants who perceive the goal of being healthy as more important will experience more regret when acting inconsistently with that goal. The regret, in turn, was expected to intensify compensatory behaviors.

One hundred eighty-five participants committed to the goal of being healthy took part in longitudinal study with four time points of data collection. These participants' mean age was $M = 25.51$ ($SD = 7.02$) and 61.60% ($n = 114$) were female. The inclusion criteria allowed

to select participants engaged in pursuing a health-related goal. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being twice as physically active as the weekly minimum. Namely, only participants who declared engaging in at least 150 minutes of moderate intensity physical activity per week, 75 minutes of vigorous physical activity per week, and self-reported (yes/no) that they maintained a healthy diet were included in the study. For purpose of inconsistency with the goal manipulation, participants were assessed to a situation in which they tasted either unhealthy or healthy products.

It was found that acting inconsistently with the goal had a significant effect on experience of regret. Participants acting inconsistently with the goal, that is tasting unhealthy products, experienced higher regret than participants acting consistently with the goal, that is tasting healthy products. It is worth noting that in this study I did not ask about regret related to eating unhealthy food, but regret related to taking part in an experiment. I showed that not only regret related to a certain behavior, such as eating a piece of cake, but regret related to being involved in a certain situation, leads to compensation and avoiding unhealthy food. Importantly, I measured experienced regret with two items, one measuring a cognitive, counterfactual regret and the other one measuring affective straightforward regret. General affective regret was not affected strongly enough by the inconsistency with the goal manipulation to show significant differences between the groups but counterfactual regret did. Nevertheless, I found expected linear contrasts showing the same pattern for affective regret as in the case of counterfactual regret.

I speculate that it might have been difficult for people to admit that they regretted taking part in a study while the study itself was still being performed. Another explanation is that the situation did not evoke strong affect. It appears that the situation in which participants tasted unhealthy products did not evoke strong emotions because the results of both regret

measures were low (<3.0 on the 10-point scale). It appears that eating unhealthy products was not an overly aversive experience for the participants. Even though the participants did not intensely regret the situation, experienced regret was strong enough to act as a mediator and lead to undertaking compensatory behaviors.

As mentioned, regret was found to be a significant mediator between inconsistency with the goal and compensatory health behaviors. Participants who ate unhealthy products reported undertaking more compensatory behaviors afterwards, such as avoiding sweets and salty snacks. The study also showed that inconsistency with the goal had a significant effect on perceived goal inhibition, which led to a higher level of regret and undertaking compensatory behaviors. Finally, I found that the importance of the goal moderated the effect of acting inconsistently with the goal on regret (see Figure 1). In line with the predictions, perception of the goal as important enhanced experienced regret in situations where participants tasted unhealthy products.

The study had a few important limitations. First, the information on the undertaken compensatory behaviors was obtained by self- reports. I believe that observing real compensatory behaviors would be even more valuable. The self-report form, however, was sufficient to measure compensatory health behaviors important for that study. Moreover, laboratory settings could have affected the amount of food that the participants consumed and resulted in a weaker inconsistency manipulation. It is worth replicating this study by applying more ecologically valid designs. Low average scores of experienced regret may indicate that manipulation of inconsistency was not strong. Indeed, the effect sizes were not strong enough to yield all results significant. For example, the effect of inconsistency on affective regret was not significant. It should be noted that when I performed this analysis without dropouts at third time point of data collection, the results were significant. In that sense, the study was underpowered because of the dropouts at this stage of the study.

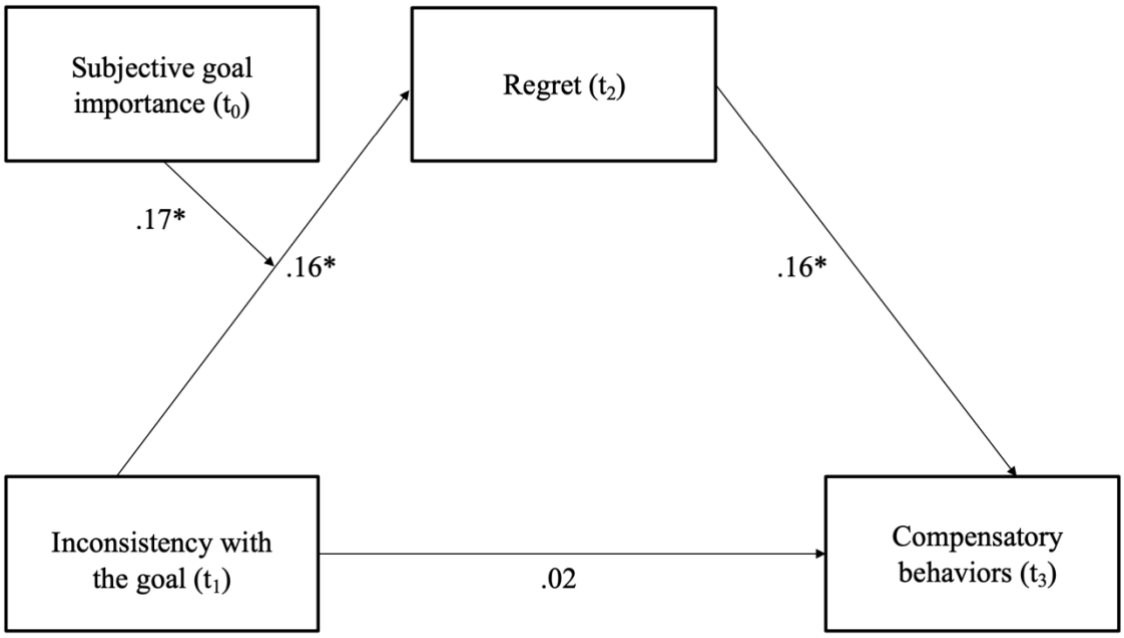

Figure 1. The standardized regression coefficients for the effect of inconsistency with the goal moderated by subjective goal importance on compensatory behaviors as mediated by counterfactual regret.

Chapter 3: Self-incompleteness and Refraining from Temptations

Publication: Sorys, K., Cantarero, K., Gollwitzer, P. M., & Byrka, K. (in press). Self-regulatory processes in striving for identity goals: Self-incompleteness shields eco-friendly vegans from temptations. *Motivation Science*. https://doi.org/10.1037/mot0000296, *IF* = 3.243.

Study 3.1

In this study, I tested whether inducing a state of self-incompleteness among vegans committed to environmental protection results in abstaining from attractive, hedonic, but not ecological dishes. I expected that experiencing incompleteness would focus individuals on the aspired-to identity goal and thus facilitate inhibiting hedonic goals. In other words, I expected that individuals experiencing incompleteness will be less likely to choose attractive and tasty non-ecological dishes compared to vegans in a completeness state and in the no-treatment control group. In addition, I tested sequential choices to see if a single compensatory action is sufficient for restoring a sense of completeness. I expected to observe self-incompleteness effects with the first dish, that is, the first choice, but less with the subsequent ones. Finally, the aim of the study was to confirm indirectly that participants facing temptations do experience self-regulatory conflict by measuring experienced post-decisional regret. I hypothesized that the choice of non-ecological, attractive temptations compared to the choice of ecological, but less attractive options will result in higher experienced post-decisional regret among eco-friendly vegans, irrespective of the experimental condition.

Only participants who found the goal of taking care of the environment as an important motive to become vegan were invited to the study. To measure commitment to environmental protection, I asked the participants to indicate how much environmental protection motivated them to follow a vegan diet. Responses below the middle of the scale value were excluded from the analysis. Three hundred twelve participants being on a vegan

diet and committed to environmental protection took part in this study. These participants' mean age was M = 27.96 (SD = 8.30) and 85.30% (n = 266) were female. After incompleteness manipulation in form of bogus feedback with the conclusion of their food choices, participants were asked to choose three times between a non-ecological, attractive temptation (e.g., sweet potato soup) and an ecologically less attractive dish (e.g., beetroot soup). Ecological dishes were defined as made out of local produce, that is, grown in the home country of Poland. Non-ecological dishes were defined as made out of produce mass-imported from far abroad.

I found that the experience of incompleteness led to less frequent temptation choices inconsistent with the aspired-to identity goal. Participants who experienced incompleteness were less likely than complete participants to choose non-ecological, attractive temptations. In the incompleteness condition, over 16% less participants chose non-ecological, attractive temptations on the first occasion as compared to the control and the completeness condition. In line with the predictions, this effect appeared only for the first choice (i.e., the soup). The second and third choices of burger and dessert, respectively, did not manifest effects of the self-(in)completeness states. Participants in the completeness and in the control condition only marginally differed in the decision about the first choice. Possibly, the participants in the control group felt that they had reached the aspired-to goal after indicating the frequency of consuming eco-friendly products before manipulation and thus did not feel the urge to undertake self-symbolizing activities anymore.

Moreover, I found that post-decisional regret was higher for the non-ecological, attractive temptation than for the ecological, less attractive option but only for the first choice. As for the choice of burger and dessert, the level of post-decisional regret did not differ between the non-ecological, attractive temptation and the ecological but less attractive option. These findings suggest that the perceived conflict between the self-defining goal of protecting

the environment and pursuing a hedonic goal is the most apparent at the first choice but then diminishes on the following occasions.

This study was designed to make the decisions as ecologically valid for participants as possible, and for this reason, the order of meals was not randomized. As in a real restaurant, the soups came as the first, the burgers the as second, and the desserts as the third choice. However, this procedure may have affected the observed results. It is not known if the stronger effect of the manipulation on the first choice does not stem from the specificity of the soups. I addressed this issue in the Study 3.2.

Study 3.2

This study was a replication of Study 3.1. I formulated the same hypotheses regarding the effect of (in)completeness states on choices, as in Study 3.1. In Study 3.2 I additionally verified the effects of the state of incompleteness on food choices, controlling for individual differences, such as self-control and pursuit of pleasure. It was hypothesized that self-control and the pursuit of pleasure would be valid predictors of the temptation choices, but should not affect the deactivation and activation of the aspired-to identity goal. Thus, I expected that the self-incompleteness manipulation would reduce succumbing to temptations beyond and above individual differences. I hypothesized that the effects of the experience of incompleteness and the experience of completeness on temptation choices will remain significant even after the introduction of self-control and the pursuit of pleasure as covariates. As in Study 3.1, only participants who found the goal of taking care of the environment as an important motive to become vegan were invited to the study (N = 219). These participants' mean age was M = 31.79 (SD = 8.81) and 74.00% (n = 162) were female. All procedures of Study 3.2 and the exclusion criteria were pre-registered at the following link https://aspredicted.org/zm9un.pdf.

Study 3.2 confirmed and extended the results of Study 3.1. As in previous study, incompleteness led to less frequent succumbing to temptations inconsistent with an important

goal compared to completeness state (see Figure 2). In Study 2, this difference was also observed for the control condition. At the first dish choice, over 26% more participants who experienced incompleteness chose non-ecological, attractive temptations compared to the completeness and the control conditions. Consistent with Study 3.1, the proportion of participants choosing temptation from the first option did not differ between the control and the completeness group. Noteworthy, these results evinced despite the change of order in which the different dishes were displayed. Again, this effect was observed only for the first dish, regardless of which type of meal was presented.

There was no significant effect of the self-control trait, but the pursuit of pleasure was associated with more frequent temptation choices. One of the explanations for why a self-control trait was not a significant covariate in the whole model whereas the pursuit of pleasure was, is that the former measure captures a more general construct than the latter, and the construct of such a broad scope had an effect too weak to detect with the present sample size. More importantly, the individual differences did not fully explain succumbing to temptations in this study. The effect of experienced incompleteness and completeness on choices of hedonic food remained significant beyond and above variables such as self-control and the pursuit of pleasure.

For all three choices of dishes, the level of post-decisional regret did not differ between the non-ecological, attractive temptation option and the ecological but less attractive option. Still, for the first choice, the medians mirrored the results in Study 3.1. The lack of significant differences might be due to a smaller sample size in Study 3.2 and likely the shrinkage of variance due to floor effects. In general, participants did not regret much of their choices; medians ranged from 0 to 1 on a five-point scale. These low scores of post-decisional regret might be due to the participants' having to make hypothetical and non-real choices.

When generalizing findings from Study 3.1 and Study 3.2, it is worth noting some limitations. First, the participants made choices in a hypothetical situation in an online setting. Certainly, the real-life choices measured by observations would be even more valuable than mere declarations made by the participants. Probably, having to make real decisions would also increase experienced conflict between the goals. Still, the choices made in a hypothetical situation were sufficient to measure succumbing to temptations in the above studies. Moreover, since the studies were conducted during the COVID-19 pandemic, ordering food online was a more common event at the time than going out to a restaurant. Even though I acknowledge the value of field experiments, in this particular time I found online studies as a more ecologically valid option. Finally, the samples were composed mostly of women. This high proportion of women, however, mirrored the proportion of vegans and persons engaged in environmental protection in the general population (Trocchia & Janda, 2003).

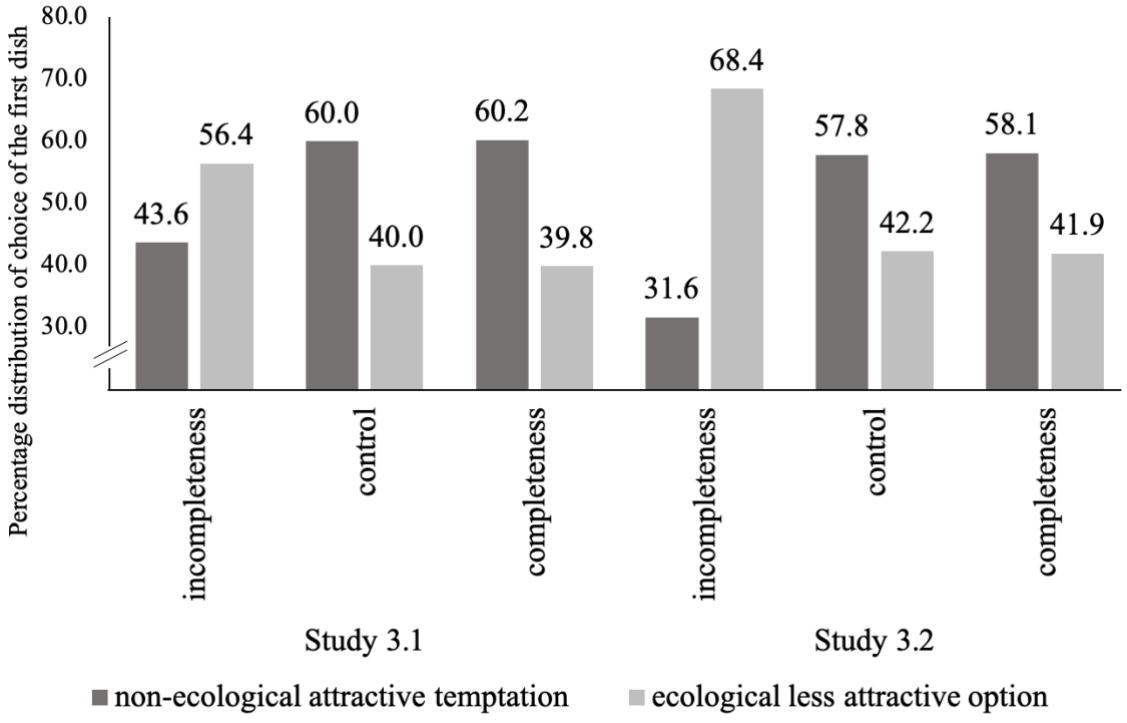

Figure 2. The proportion of choices of the non-ecological, attractive temptation and the ecological but less attractive option in the three experimental conditions (Study 3.1 and Study 3.2).

Chapter 4: Self-incompleteness and Preference for Instrumental Symbols

Manuscript: Sorys, K., Gollwitzer, P. M., & Byrka, K. (2023). *The states of self-incompleteness direct individuals' preference towards more instrumental symbols*. [Manuscript in preparation]. Faculty of Psychology, SWPS University of Social Sciences and Humanities.

Study 4.1

So far, no studies have examined preference for instrumental symbols in the (in)completeness states. Past studies' designs have not captured situations in which individuals had to choose between two or more available symbols in the (in)completeness states either but rather observed certain self-symbolizing activities. In this study, I examined whether eliciting a state of incompleteness among committed runners prompts them to choose a symbol more instrumental for an important goal, compared to runners experiencing a state of completeness. I expected that experiencing the state of incompleteness would increase the likelihood of choosing a more instrumental symbols compared to the state of completeness.

One hundred ten health-conscious participants engaged in undertaking physical activity took part in the study. These participants' mean age was M = 41.24 (SD = 13.49) and 62.70% (n = 69) were female. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being active for minimum 75 minutes of vigorous physical activity per week. After (in)completeness manipulation in form of bogus feedback with the conclusion of their performance, participants were asked to choose between symbol less instrumental for a goal (a thermal mug) and symbol more instrumental for a goal (a massage roller).

I found that self-(in)completeness states had an impact on the choice of a symbol. The experience of incompleteness conduced to a more frequent choice of more instrumental symbol, while the experience of completeness resulted in a more frequent choice of less

instrumental symbol. Participants who experienced incompleteness resulting from having received negative feedback on their recent physical activity performance were less likely than participants in completeness condition to choose less instrumental symbol; instead, they more often chose symbol more instrumental for their goal. Reversely, participants who experienced completeness chose less instrumental symbol more often than symbol more instrumental for the goal. This result showed that symbols may differ in a way they are perceived as effective in pursuing the goal.

In Study 4.1, I focused on exploring the main effect of (in)completeness manipulation on choice between less and more instrumental symbol. However, I did not measure the perceived instrumentality of the symbols. In order to extend results from this study, I addressed this issue in Study 4.2.

Study 4.2

This study was a modified replication of Study 4.1, with changed form of (in)completeness manipulation. Randomly generated bogus feedback was replaced with recall procedure. I formulated the same predictions regarding the states of incompleteness and completeness as in Study 4.1, that is, I expected that highly committed runners in the incompleteness condition will be more likely to choose symbol more instrumental for a goal than participants in the completeness condition. In addition, I investigated the perceived instrumentality of the symbols measured as effectiveness for an important goal. It was hypothesized that symbols i.e., a massage roller and a thermal mug will differ in instrumentality, in a way that a massage roller will be perceived as more effective for a goal of being a physically active runner than a thermal mug. As in Study 4.1, only health-conscious participants engaged in undertaking physical activity were invited to the study (N = 142). These participants' mean age was M = 28.91 (SD = 8.66) and 73.20% (n = 104) were female.

Study 4.2 confirmed and extended the results of Study 4.1. As in previous study, a self-(in)completeness states affected a subsequent choice of symbol, in a way that experience of incompleteness resulted in a more frequent choice of the symbol more instrumental for a goal, than the experience of completeness. Noteworthy, these results evinced despite the change of manipulation. Study 4.2 demonstrated as well the difference in instrumentality between two symbols. The effectiveness of symbol more instrumental for a goal (i.e., a massage roller) was found to be higher than the effectiveness of symbol less instrumental for a goal (i.e., a thermal mug). However, Study 4.2 did not explore perceived effort of using a given symbol, which was found to affect perceived effectiveness in attaining a goal (Labroo & Kim, 2009). I addressed this issue in Study 4.3.

Study 4.3

This study was a modified replication of Study 4.2 with a different set of symbols. Instead of a thermal mug and a massage roller, two applications for runners were introduced as symbols to choose from. In Study 4.3, I made the same predictions regarding the states of incompleteness and completeness and instrumentality as in Study 4.1 and Study 4.2, that is, I expected that highly committed runners in the incompleteness condition will be more likely to choose application which is more instrumental for a goal than participants in the completeness condition and predicted differences in perceived instrumentality between symbols. The perceived effort in realizing more and less instrumental symbols was measured as well. I hypothesized that application perceived as more instrumental for the important goal will be also perceived as one requiring more use of effort than application less instrumental for the important goal. Similarly, only health-conscious participants engaged in undertaking physical activity were invited to this study (N = 173). These participants' mean age was M = 36.08 (SD = 11.89) and 47.40% (n = 82) were female. All procedures of Study 4.3 and the exclusion criteria were pre-registered at the following link https://aspredicted.org/NL7_C42.

Study 4.3 confirmed and extended the results of Study 4.1 and Study 4.2. The same effect of self-(in)completeness states on choice of symbol was found. The experience of incompleteness led to a more frequent choice of the symbol more instrumental for a goal than the experience of the completeness. This time, after change of symbols, the results evinced short of conventional *p* value, $p = .055$. This may be due to the fact that the dependent variable in this study was more complex and the choice might have been affected by different confounds. Moreover, this study vindicated the difference in perceived instrumentality between two symbols. The instrumentality of symbol more instrumental for a goal (Application 2) was found to be higher than instrumentality of symbol less instrumental for a goal (Application 1) in terms of effectiveness. Finally, symbol more instrumental for the important goal (Application 2) was perceived as one requiring more effort to use than symbol less instrumental for the important goal (Application 1), which suggests that engagement of effort required for using symbols is concurrent with instrumentality. In Study 4.3 I did not measure the effect of social reality on self-symbolization, so I addressed this issue in Study 4.4.

Study 4.4

This study was a modified replication of Study 4.3. In Study 4.4 I introduced the manipulation of social reality next to (in)completeness manipulation and extended measurement of instrumentality of symbols by creating an index composed of three statements about both symbols (effectiveness, usefulness and helpfulness in goal strive). In this study participants were choosing between two applications for runners, as in Study 4.3. In Study 4.4 I made the same predictions regarding effect of self-(in)completeness manipulation on symbol choice, instrumentality and effort as in studies 4.1 – 4.3. I also hypothesized that effect of self-(in)completeness manipulation on symbol choice will be qualified by social reality in such a way that in the social reality condition the difference in the likelihood of

choosing more instrumental option in the incompleteness condition compared to completeness condition will be larger than in the no social reality condition. Again, only health-conscious participants engaged in undertaking physical activity were invited to this study (N = 200). These participants' mean age was M = 37.15 (SD = 11.60) and 48.50% (n = 97) were female. All procedures of Study 4.4 and the exclusion criteria were pre-registered at the following link https://aspredicted.org/CVK_1LD.

Study 4.4 confirmed and extended the results of studies 4.1 - 4.3. The same effect of self-(in)completeness states on choice of symbol was found. The experience of incompleteness led up to a more frequent choice of the symbol more instrumental for a goal than the experience of completeness. The hypothesis regarding social reality was not confirmed and social reality did not qualify the effect of (in)completeness manipulation on the choice of the symbol. It is possible that the participants found it difficult to believe that their answers would not be noticed by others, which makes the no social reality condition hard to achieve.

The instrumentality of symbol more instrumental for a goal (Application 2) was found to be higher than instrumentality of symbol less instrumental for a goal (Application 1) in terms of effectiveness and when measured as an index of three items including statements such as helpful, useful and effective in achieving the important goal. Finally, a symbol more instrumental for the important goal (Application 2) was perceived as one requiring more effort than a symbol less instrumental for the important goal (Application 1), which is consistent with results achieved in Study 4.3.

Some limitations of studies 4.1 – 4.4 have to be mentioned. Similarly as in the studies included in Chapter 3, choices between symbols were made in online setting instead of real-life conditions measured by observations. A studies designed to measure choices in real-life conditions showing the preferences between more and less instrumental symbols in self-

(in)completeness states are essential extension of findings presented in my research. Another limitation is exploration of two conditions i.e., incompleteness and completeness and not including control condition. In my studies I focused on two states distinguished in self-completion theory but in the future, it is warrant to explore control group as comparison. Finally, samples in Studies 4.1 – 4.4 were composed only of committed runners.

Meta-analysis for studies 4.1 – 4.4

In order to summarize the effect of (in)completeness manipulation on choice of the symbol, I conducted a meta-analysis for Studies 4.1 – 4.4. Overall, the results showed that the pooled effect size was *OR* = 2.07, 95% CI [1.46, 2.94]), $p < .001$ (see Figure 3). Participants in the incompleteness condition were choosing instrumental symbol more often than participants in the completeness condition in Studies 4.1 – 4.4.

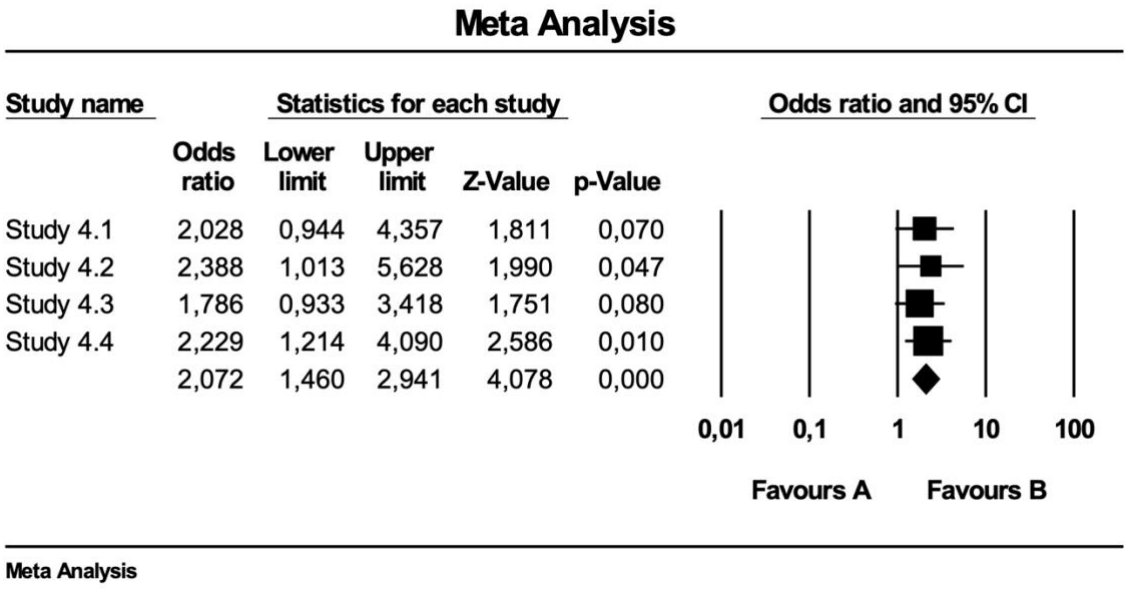

Figure 3. A meta-analysis for Studies 4.1 – 4.4 summarizing the effect of (in)completeness manipulation on choice of the symbol.

Chapter 5: General Discussion

Goal pursuit is one of the most important constructs in the psychology of motivation, which has been widely explored in numerous studies constituting theories e.g., the symbolic self-completion theory (Wicklund & Gollwitzer, 1982), the theory of goal systems (Kruglanski et al., 2002) and the control theory (Carver & Scheier, 1982). New findings in this matter are constantly developing and studies presented in my doctoral dissertation are part of contribution to the existing knowledge. My research examined affective aspects of compensation, sequential self-symbolization in a situation of goal conflict and the instrumentality of symbols.

The first of my research goals was to explore affective mechanisms behind compensation. Specifically, I aimed to test the role of the experience of regret in regulation of compensation. My research extends the literature on the affective mechanism of failure to engage in healthy behaviors consistent with an important goal, and compensatory behaviors. I found that regret related to being involved in a situation that inhibits goal pursuit is an important factor in the process of compensation, particularly for those who perceive a certain goal as important to them.

The second goal of my research was to examine whether the state of self-incompleteness in an important goal makes individuals to refrain from temptations. I found that the experience of incompleteness makes succumbing to hedonic temptations less likely and leads to undertaking behaviors consistent with the aspired-to identity goal. My studies also showed that the effect of incompleteness on refraining from giving in to temptations is short lasting.

Finally, as a third goal of my work I aimed to test whether the state of self-incompleteness leads to the choice of symbols more instrumental for the identity goal. Four studies confirmed that the experience of incompleteness conduces to a more frequent choice

of symbol instrumental for an important goal. Moreover, instrumental symbols were perceived as more effective for achieving an important goal and were associated with engaging more effort.

Results presented in Chapter 2, regarding affective mechanisms of compensation, are coherent with previous findings in the context of physical activity, showing that skipping a scheduled workout leads to experience of regret, and in turn triggers compensatory behaviors (Byrka et al., 2018; Byrka et al., 2020). The relation found between perceived goal inhibition and regret is also consistent with the result showing that people have to perceive their actions as a cause of failure in order to experience regret (Zeelenberg & Pieters, 2004b). The result showing that perception of the goal as important enhanced experienced regret in situations where participants tasted unhealthy products, is in line with previous findings by Fishbach et al. (2003) and Shah et al. (2002) that showed that the initiation of self-regulatory processes is more likely when pursued goals are perceived as important to individuals.

Aside from new insights, my study also opens new avenues for research regarding affective mechanisms of compensation. In the future it is worth exploring if acting inconsistently with a goal translates into compensatory behaviors in domains other than food, such as hygiene or substance avoidance, which would indicate that this mechanism is more universal. Another question is whether similar mechanisms would work for active undertaking of compensatory behaviors (e.g., exercising for a longer time) as it worked for avoidance of unhealthy food, which seems to be a more passive and accessible form of compensation. Past research has shown that exposition to physical activity leads to compensation by serving more calories in meals (Koenigstorfer et al., 2013; Werle et al., 2015). It would be interesting to see if this mechanism also works in the opposite way, so that eating more results in undertaking physical activity, and whether this can be explained by experienced regret. Future research should also focus on the length of time after which

compensatory behaviors appear. It seems as an interesting avenue of exploration to collect information about undertaken compensatory behaviors on a regular basis, so as to capture their time dynamics. This kind of procedure may make it possible to answer the question of how much time is needed before one begins undertaking compensatory behaviors.

Past research on self-completion has shown that incompleteness leads to intensified pursuit of an aspired-to identity goal when an opportunity to self-symbolize is encountered (Gollwitzer et al., 1982; Gollwitzer & Wicklund, 1985; Gollwitzer, 2018; Longoni et al., 2014; Marquardt et al., 2016) and that self-symbolizing effectively minimizes a person's respective goal orientation in general (Sciara et al., 2022). Enriching these findings, results presented in Chapter 3 regarding self-incompleteness and refraining from temptations, suggest that in a state of incompleteness, people are not only enhancing the pursuit of the aspired-to goal, but they also inhibit the execution of activities that hamper this goal pursuit. The findings showing that the urge to self-symbolize is not permanent, is in line with classic works on interruption (Lewin, 1926; Mahler, 1933), and it appears that a single compensatory action may be sufficient for restoring a sense of completeness. Consistently with previous findings, the experience of regret was linked to engaging in behavior inconsistent with an important goal (Sorys & Byrka, 2021; Valshtein & Seta, 2019). A decrease in perceived conflict with each subsequent decision could be explained with the effect of satiation. For example, Larson et al. (2014) observed that the sensation of satiation increases with repeated choices of food products when these choices are only hypothetical and food is presented on pictures. These results suggest that effects of satiation appear even if real products are not present and participants are not physiologically satiated. In Study 3.2 I found that the pursuit of pleasure was associated with more frequent temptation choices but there was no significant effect of the self-control trait. More specific constructs such as hedonic capacity, that is ability to successfully pursue a hedonic goal, might be better predictors of preference for hedonic

foods (Bernecker & Becker, 2021). Specifically, the subscale of hedonic success should be related to the preference for aesthetic hedonic dishes, as it captures ability to relax and go astray from focal goal pursuit.

There are lines of research regarding self-incompleteness and refraining from temptations worth further exploration. Future research should explore self-regulatory processes related to the pursuit of aspired-to identity goals over time by using more powerful designs. My analysis was limited to three independent tests with a dichotomous outcome and forced decisions. Such a design cannot account for the variability in individuals' behaviors, such as the possibility of inaction leading to not choosing any option. Moreover, perceived conflict between competing goals is a subject of intra- and inter-individual exchanges and should be studied accordingly (Wennerhold & Friese, 2022). Conducting longitudinal studies with multiple measurement points would allow to capture the exact dynamics of the processes taking place in the pursuit of conflicting goals. In my studies I focused on commitment as a relatively stable and more of a trait-like variable. Recent research suggests that commitment to a short-term task goal can be induced on the spot by giving participants' the liberty to choose a task (Falk et al., 2022; Gendolla et al., 2021), and such induced short-term commitments, in turn, manage to shield task performance from incidental affective influences. The potential of induced commitments to shield an individual from temptations when striving for an identity goal however still needs respective experimental research.

Results presented in Chapter 4, regarding instrumentality of symbols, are consistent with the self-completion theory. Previous studies showed that individuals in the incompleteness state prioritize the pursuit of important identity goals and engage in self-symbolizing behaviors effective for achieving an important goal (Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Sorys et al., in press; Wicklund & Gollwitzer, 1981). My studies showed as well that instrumentality is connected with effort (Kruglanski et

al., 2002). I found that highly committed individuals engaged in striving their identity goal are more likely to choose effortful symbols in the state of incompleteness and don't favor tools that require the least effort (Schwarz, 2004). To date, work grounded in goal-systems theory has shown that means which fit goals' motivational orientation toward approach or avoidance (Hennecke, 2019), require effort (Labroo & Kim, 2009) and cause pain (Schumpe et al., 2018) are perceived as more instrumental. My results showing that more effortful symbols are also perceived as a more instrumental for achieving an important goal confirmed that individuals perceive differences in instrumentality of symbols when evaluating their effectiveness for aspired-to identity goal. Contrary to the hypothesis, social reality did not enhance the effect of (in)completeness manipulation. I speculate that social reality manipulation is difficult to be successful in an online setting. Previous studies showing effect of social reality condition on self-symbolization were conducted in real-life conditions (Gollwitzer, 1986; Gollwitzer et al., 2009) and so far, there is no evidence that this procedure can be translated into online settings. Moreover, no social reality condition may be hard to introduce online due to the fact that nowadays almost everything that individuals do online is registered and tracked, an example of which is personalized advertising on social networking sites.

Results presented in Chapter 4 set new questions for future research regarding instrumentality of symbols. It is worth examining more factors related to instrumentality of symbols than effort. Prior work suggested than pain can be related to increased instrumentality (Schumpe et al., 2018). Kruglanski et al. (2002) state that instrumentality (or subjective utility) driving the choice of means is associated with many factors beyond effort, e.g., circumstances or expectancy of goal attainment. For example, when impressing the audience is important, individual may opt for means that acquire such an effect. Studies grounded in self-completion theory, capturing different instrumentality-related phenomenon

could greatly contribute to the existing results. It also seems important to further investigate instrumentality of symbols in context of social reality which is a crucial component of symbolic self-completion (Wicklund & Gollwitzer, 1982) and was found to be an important factor influencing self-symbolization (Gollwitzer et al., 2009). Instrumentality of symbols should also be considered in the context of compensatory self-symbolizing. It would be interesting to explore whether perceived instrumentality of symbols influence the effect of self-incompleteness enhancing engagement in self-symbolizing behaviors (Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Sorys et al., in press; Wicklund & Gollwitzer, 1981) and self-completeness results in lesser engagement in self-symbolization (Doerflinger et al., 2021; Wicklund & Gollwitzer, 1981). It would be worth exploring in future research whether perceived instrumentality of symbols is stable over time or can it change due to external factors e.g., weather, or internal factors e.g., mood. Lastly, I find it interesting to test effects of manipulation of instrumentality. It should be tested if manipulation of a description of the same product may change the preferences of symbols choice both in committed and non-committed samples.

All of the results presented in my research require common future explorations. First, my studies were conducted inside the laboratory or designed in a way that participants made choices in a hypothetical situation in an online setting. It could be highly valuable to conduct similar studies in more ecologically valid designs and measure real-life choices by observations. A hypothetical decision making was found to minimize social reality, which is known to enhance the effects of self-(in)completeness states (Pantaleo, 1997; Pantaleo & Wicklund, 2000; Wicklund & Gollwitzer, 1982). Another direction for future research would be to focus on different samples, goals, individual differences and covariates than the ones presented in my studies. For example, in the context of affective mechanisms of compensation, it would be interesting to focus on a sample of restrained eaters who have a

tendency to experience guilt and overeat after exposure to caloric food (Polivy et al., 2020). It is likely that restrained eaters would be more sensitive than unrestrained eaters to manipulations of inconsistency and would probably experience higher levels of regret, as a very similar emotion, guilt, was found to be foundational to restrained eating. Also, restrained eaters would probably be less likely to avoid fatty food and sweets by means of compensation as their self-regulatory processes are not as efficient as those of unrestrained eaters (Herman et al., 1987). It is still warranted to explore diverse samples in which conflicts between identity and hedonic goals occur, including identity goals such as being a "party goer". A realization of the hedonic goal may be facilitating for the realization of this primal identity goal. In such cases, cross-goal self-symbolizing dependent on which self-symbols will be available should be observed (see e.g., Doerflinger et al., 2021). Similarly, diverse symbols corresponding to different identity goals may differ in their instrumentality and factors it depends on.

The research presented in my dissertation was aimed at exploration of new fields regarding compensation in goal striving. I contributed to existing findings by showing affective mechanism of failure to engage in behaviors consistent with healthy goal, and compensatory reactions. Moreover, I showed the self-regulatory effect of self-(in)completeness states in resolution of conflict between identity goal and competing hedonic goal. Finally, my investigation innovatively considers instrumentality of symbols presenting efficacy in goal pursuit.

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A list of scientific publications and manuscripts included in the dissertation

Publication of Study 2.1

Sorys, K., & Byrka, K. (2021). Acting inconsistently with an important goal predicts compensatory health behaviors through regret. *Appetite, 163*, 105217. https://doi.org/10.1016/j.appet.2021.105217

Publication of Studies 3.1 - 3.2

Sorys, K., Cantarero, K., Gollwitzer, P. M., & Byrka, K. (in press). Self-regulatory processes in striving for identity goals: Self-incompleteness shields eco-friendly vegans from temptations. *Motivation Science*. https://doi.org/10.1037/mot0000296

Manuscript based on Studies 4.1 - 4.4

Sorys, K., Gollwitzer, P. M., & Byrka, K. (2023). *The states of self-incompleteness direct individuals' preference towards more instrumental symbols*. [Manuscript in preparation]. Faculty of Psychology, SWPS University of Social Sciences and Humanities.

The Co-Authorship Statement (Publication of Study 2.1)

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The candidate Klaudia Sorys contributed to the conceptualization of the research, its design, data collection, conducted the statistical analysis, wrote the original draft and participated in the revisions of the manuscript. The candidate's contribution is at least 50%.

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Acting inconsistently with an important goal predicts compensatory health behaviors through regret

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ABSTRACT

Objective: This study explored affective mechanisms of compensatory health behaviors after acting inconsistently with an important goal. Specifically, we propose and test a model in which regret over being in a situation that inhibits goal pursuit lays at the root of an individual's engagement in compensatory behaviors such as avoiding fatty foods and sweets.

Methods: A total of 185 participants committed to being healthy took part in a longitudinal experiment (t_0-t_3). At t_0 we measured the extent to which the goal of being healthy was important to participants. At t_1 in the laboratory setting we manipulated inconsistency with the goal by asking participants to taste foods either more or less calorie-dense. After the manipulation (t_2) we measured experienced regret. Twenty-four hours later (t_3), participants declared whether they engaged in compensatory health behaviors such as avoiding fat-dense food and sweets.

Results: As predicted, acting inconsistently with a goal was associated with higher levels of experienced regret. Higher regret, in turn, predicted engagement in compensatory health behaviors. Moreover, subjective importance of the goal moderated the effect of inconsistency on experienced regret in such a way that more committed individuals experienced more regret when they acted inconsistently with a goal.

Conclusions: We discuss the results and propose new avenues for research on compensation in broader contexts of situational and individual differences.

Imagine that you are a health-conscious individual, deeply committed to exercising regularly and maintaining a healthy diet. You avoid sugar, excessive salt and saturated fat. One day, a neighbor drops by unannounced and offers you a slice of a quite rich birthday cake. It feels awkward to refuse celebrating with your friend, so you decide to have a taste of cake.

Sometimes people are thrown into situations where they involuntarily violate their own standards and behave inconsistently with goals they declare are important. Previous research shows that acting inconsistently with a goal triggers various self-regulatory processes (Fishbach, Friedman, & Kruglanski, 2003). One possible response to failures in pursuing important goals is undertaking compensatory behaviors that serve this goal (Moskowitz & Gesundheit, 2009; Rabiau, Knäuper, & Miquelon, 2006). People may engage in behaviors consistent with the goal to neutralize the negative effects of previously undertaken unhealthy behaviors. For example, a person that has eaten a piece of birthday cake may avoid sweets until the end of the day, or skip a later meal.

Failure to act consistently with an important goal causes a discrepancy that produces unpleasant tension (Higgins, 1987; Moskowitz & Gesundheit, 2009; Rabiau et al., 2006). This tension, in turn, triggers compensatory responses, including compensatory behaviors. To date, the affective mechanism of compensation has not been studied extensively. Relatively little longitudinal experimental research has been conducted to explore the process of undertaking compensatory health behaviors.

We address this niche and expand previous findings on compensation by focusing on affective mechanisms. Specifically, we propose a model in which regret mediates acting inconsistently with an important goal and compensatory behaviors. Experiencing regret stems from realizing that a given person would be better off if he or she acted differently (Zeelenberg & Pieters, 2007). Thus, we hypothesize that regret arising from being in a situation that inhibits the pursuit of an important goal will trigger compensatory health behaviors. We also expect that engaging in a situation that is inconsistent with a goal will lead to regret particularly among individuals who perceive the goal as important to

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them.

1.1. Acting inconsistently with a goal and compensatory behaviors

Goal pursuit is compensatory in nature (Moskowitz & Gesundheit, 2009). People engage in compensatory responses when they perceive a discrepancy between a desired end-state, that is, what they should do (e.g., being fit) and what they actually do (e.g., when they have a piece of birthday cake). Various approaches emphasize different mechanisms of compensation, but they all focus on the discrepancy between a current state, a desired state and the tension raised.

According to the compensatory health beliefs model (Rabiau et al., 2006), compensation occurs as an effect of the tension that arises in response to the motivational conflict between long-term goals and strong desires for immediate gratification. When individuals face a temptation that conflicts with their important goal, they begin to form compensatory beliefs or compensatory intentions to minimize unpleasant tension (Kronick & Knäuper, 2010). These cognitive compensatory responses lead to compensatory behaviors under the condition that they enhance the self-efficacy required for the goal pursuit (Lippke, Wiedemann, Ziegelmann, Reuter, & Schwarzer, 2009). In line with this model, compensatory health behaviors are intentional actions that are perceived as a means to achieve long-term goals (Kronick, Auerbach, Stich, & Knäuper, 2011; Rabiau et al., 2006). They are undertaken to neutralize or compensate for the negative effects of previously undertaken unhealthy behaviors (Rabiau et al., 2006). Fishbach et al. (2003) also showed that mere exposure to temptations channels unconscious self-regulatory processes that, in turn, activate the long-term goal pursuit. These mechanisms are particularly likely to occur if individuals subjectively evaluate the long-term goals as important.

According to the theory of symbolic self-completion (Gollwitzer, 2018; Wicklund & Gollwitzer, 1981) some goals that individuals pursue are important because they are central to their identity. These goals make individuals engage in various activities, so-called self-symbolizing activities, in order to achieve a state of self-completeness (Wicklund & Gollwitzer, 1981). Exemplary self-symbolizing activities for the attainment of the goal of being healthy are exercising regularly and maintaining a balanced diet. In situations where people act inconsistently with the goal, that is, they undertake behaviors that might inhibit goal pursuit, they experience a state of self-incompleteness. Incompleteness is aversive to the extent that it forces individuals to undertake self-symbolizing compensatory behaviors (Moskowitz & Gesundheit, 2009). Only failure in an important and relevant domain triggers the state of incompleteness and further compensation. If the discrepancy between the desired end-state and the present situation occurs in an unimportant domain, no tension and discrepancy should be expected.

The self-completion theory emphasizes that compensation is far more likely for individuals that are highly committed to an important goal. Commitment to goals is associated with a strong sense of determination, tendency to adhere to a focal goal, unwillingness to abandon or lower the original goal, and willingness to invest effort (Hollenbeck & Klein, 1987; Kruglanski et al., 2002; Nenkov & Gollwitzer, 2012; Oettingen, Pak, & Schnetter, 2001; Shah, Friedman, & Kruglanski, 2002). For example, in a study by Longoni, Gollwitzer, and Oettingen (2014), participants highly concerned about environmental issues who learned that they had made unecological consumer decisions engaged more in recycling at the next occasion.

The processes behind compensatory reactions are not exclusively motivational, but are also affective in nature (Higgins, 1989). Rabiau et al. (2006, see also Giner-Sorolla, 2001) propose that the affective mechanism behind compensatory behaviors is grounded in experiencing guilt after acting inconsistently with the goal. Based on previous research, we believe that it is rather regret that triggers compensation in the health domain. Although the two emotions are sometimes invoked interchangeably, they have distinct characteristics important in compensatory processes. Guilt is a more social and interpersonal feeling and often arises as a result of violating some moral standards (Zeelenberg & Breugelmans, 2008). Regret, in contrast, arises as a consequence of violating personal standards or experiencing an outcome that conflicts with expectations. Regret seems also more likely to trigger future behaviors to undo decisions that inhibit achievement of an important goal which is particularly relevant for compensation.

So far, the role of regret in compensation has been explored in the context of physical activity. One study showed that evoking regret after failure to exercise induced compensatory behaviors and reduced the level of involvement in socialization. Participants who felt regret about not attending a fitness session reported that they met friends and colleagues less often than participants who did not experience regret (Byrka, Łuszczyńska, & Abraham, 2018). In another study, participants who experienced more regret after failure to attend a scheduled exercise session tended to compensate more often by taking up behaviors associated with physical activity, e.g., walking (Byrka, Scholz, Radtke, Arnheim, & Łuszczynska, 2020).

1.2. Regret as motivator for future behaviors

We argue that regret is an action-control emotion that triggers compensatory actions (e.g., Giner-Sorolla, 2001; Zeelenberg & Pieters, 2007). Regret is a product of an unfavorable assessment of a decision, and it leads to a strong desire to undo the decision (Zeelenberg & Pieters, 2007). As such, it is a powerful factor in motivating and giving direction to behaviors. Past research has shown that customers dissatisfied with a service provider that generated an experience of regret most often decided to change the service provider (Zeelenberg & Pieters, 2004a). Most people feel a need to undo a regrettable action as soon as possible; they would prefer to undertake behavior minimizing their regret within not more than a day after the regrettable event (Zeelenberg, van der Pligt, & Manstead, 1998). The more intense the experienced regret is, the stronger it prompts individuals to undertake actions.

The experience of regret is aversive to the extent that even hypothetical consideration of it motivates people to act in order to avoid negative affect (Sheeran & Orbell, 1999). To date, most research in the health domain has explored the effects of regret on future behaviors in hypothetical situations. So far, anticipated regret has been found to predict behavioral intentions and health behaviors (e.g., Abraham & Sheeran, 2003, 2004; de Nooijer, Lechner, Candel, & de Vries, 2004; Richard, de Vries, & van der Pligt, 1998). For example, anticipated regret after an imagined failure to act on one's intentions predicted exercising (Abraham & Sheeran, 2003) or refraining from risky sexual behaviors (Richard, Van der Pligt, & De Vries, 1996). We argue that it is crucial to explore not only anticipated but also experienced regret when studying its role in compensatory processes. One of the reasons is that imagined and actual regret do not always coincide. For example, Gilbert and Wilson (2007) showed that imagined future emotions are more intense than actually experienced ones. Moreover, imagined regret does trigger an individual's motivation to revert and undo the decision.

One of the basic conditions for regret to occur is the sense of personal agency when making decisions. Zeelenberg, van Dijk, and Manstead (1998) explored the experience of regret in terms of taking action versus remaining passive. A set of experiments showed that students who signed up for unsatisfactory undergraduate courses (undertook an action) were found to experience more regret than students who were automatically assigned courses by a computer (remained passive). Only autonomous choices that do not lead to an expected goal evoke a sense of immediate regret (Zeelenberg, Inman, & Pieters, 2001). In other words, people need to perceive their actions as the cause of the failure for the experience of regret to occur (Zeelenberg & Pieters, 2004b). We thus expect that acting inconsistently with an important goal will be more likely to cause regret if the inconsistent behavior is perceived as inhibiting goal pursuit.

Regret plays a self-regulatory role and arises when individuals fail to

find an optimal balance between fulfilling immediate desires and meeting long-term goals (Conner, Conner, Sandberg, McMillan, & Higgins, 2006; Gilovich & Medvec, 1994, 1995). Accordingly, the more important a given long-term goal is to individuals, the more regret they should experience in situations of failure to pursue this goal. In support of this stance, Van Dijk, Van Der Pligt, and Zeelenberg (1999) showed that people who invested effort in achieving a goal experienced more regret after a failure of implementation than individuals who expended less effort in the act of goal pursuit. Shah et al. (2002), in turn, showed that individuals engage in self-regulatory processes only if they perceive a certain goal as important to them.

To summarize, the compensation models emphasize that compensation occurs as a result of acting inconsistently with an important goal when the desired end-state differs from the current situation. This state of discrepancy evokes tension and negative emotions. So far, a few studies have suggested that regret about past behavior, such as failing to exercise, influences whether compensatory behaviors are undertaken or not (e.g., Byrka, Łuszczynska, & Abraham, 2018; Byrka et al., 2020). Previous results also suggest that experienced regret should be more intense among individuals who identify a certain goal as important to them. Finally, so far, less attention has been paid to experienced regret than anticipated regret when testing its effects on future health and compensatory health behaviors. We think that this may be partially due to the fact that studying regret and compensation requires more complex longitudinal study designs.

1.3. Research goals

Building on existing findings, we expect health-conscious participants acting inconsistently with an important goal will experience more regret compared to participants acting consistently. Specifically, we hypothesize that health-conscious individuals should experience more regret when assigned to the condition that will require tasting high-calorie food, such as croissants or chips, than in a condition where they will taste only healthy food such as sunflower seeds or kiwi fruit. Additionally, the situation of inconsistency should result in a higher likelihood to perceive this situation as inhibiting an important goal.

Further, we propose and test a model in which the link between a failure to act consistently with a healthy goal and compensatory health behaviors is mediated by regret over being involved in a given situation. In other words, a belief that an individual would have made a different decision if given another chance to do it should trigger compensation.

Previous research on regret showed that people need to perceive that their behaviors are what inhibited goal pursuit and caused failure in order for the experience of regret to occur (Zeelenberg & Pieters, 2004b). In order to validate this mechanism of evoking regret, we will test one more serial mediation in which we enter perceived goal inhibition as the first mediator and regret as the second. We expect that inconsistency will cause higher regret when individuals perceive a given situation as inhibiting their goal pursuit. Thus, we will test the model in which inconsistency affects perceived goal inhibition, then perceived goal inhibition affects experienced regret, which in turn affects compensatory health behaviors.

Finally, as the literature suggests that experienced regret should be more intense among individuals who find a certain goal important to them, we will test a moderated mediation model in which the effect of inconsistency on regret is qualified by the subjective importance of the goal. Specifically, we hypothesize that subjective goal importance will moderate the relation in such a way that participants who perceive the goal of being healthy as more important will experience more regret when acting inconsistently with that goal. The regret, in turn, will intensify compensatory behaviors.

2. Method

2.1. Study design

Data was collected at four time points (see Fig. 1): at the baseline (t_0), at the meeting in the laboratory before the manipulation (t_1), at the meeting in the laboratory after the manipulation (t_2), and 24 h after the meeting (t_3). We performed a 4 × 1 experiment with random allocation to the inconsistency of the goal condition (healthy = 1 vs. moderately healthy = 2 vs. moderately unhealthy = 3 vs. unhealthy = 4) as a between-subject factor and experienced regret (t_2) as the dependent variable. In the first mediation model, inconsistency with the goal served as a causal antecedent (X), regret as a mediator (M), and the self-reported compensatory behaviors (t_3) as an outcome variable (Y). In the second serial mediation model, inconsistency with the goal served as a causal antecedent (X), perceived goal inhibition as the first mediator (M1), regret as the second (M2), and self-reported compensatory behaviors (t_3) as an outcome variable (Y). In a moderated mediation analysis, for the single mediation with regret we additionally included subjective importance of the goal (t_0) as a moderator (W) on the path from the inconsistency to the goal and regret.

We declare that the hypotheses were specified before the data were collected, the analytic plan was pre-specified, and all data-driven analyses are clearly identified and discussed appropriately.

2.2. Participants

The initial sample consisted of 305 volunteers who entered the study platform, met the inclusion criteria, and completed the base measurement (t_0). The inclusion criteria allowed us to select participants engaged in achieving a health-related goal. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being twice as physically active as the weekly minimum. Namely, only participants who declared engaging in at least 150 min of moderate intensity physical activity per week, 75 min of vigorous physical activity per week, and self-reported (yes/no) that they maintained a healthy diet were included in the study.

Of the initial 305 participants $n = 185$ followed the entire procedure (t_0-t_3), and data from this sample were further analyzed. These participants' mean age was $M = 25.51$ ($SD = 7.02$), ranging from 18 to 57 years, and 61.60% ($n = 114$) were female. The majority (80.54%, $n = 149$) had a body mass index (BMI) ranging from 18 to 25, indicating normal body mass. Only 5 (2.70%) participants had a BMI below 18, while 31 (16.76%) participants had a BMI above 25, indicating that they were overweight or obese.

Prior to the study, we conducted power analyses using G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007) for expected medium effect sizes. The results suggest that, given an alpha of .05 and a power of .95, a sample of 196 participants would be required to detect an effect size of Cohen's $d = .30$ in testing the difference between experimental groups.

2.2.1. Participants' attrition

A dropout was defined as a situation in which a participant did not complete all three stages of the study (t_0-t_3). Participants who dropped out ($n = 120$, 39.34%) and those who completed the entire study did not differ in gender, χ^2 (1, $N = 304$) = 2.53, $p = .112$, age $F(1, 304) = 3.38$, $p = .067$, and BMI χ^2 (2, $N = 304$) = 1.01, $p = .604$. The results of the above analyses do not indicate any bias regarding participants abandoning the study before completion.

2.3. Procedure

Participants were recruited via announcements on a university website or announcements on the social media platforms of groups related to sports. After entering the study platform, participants received

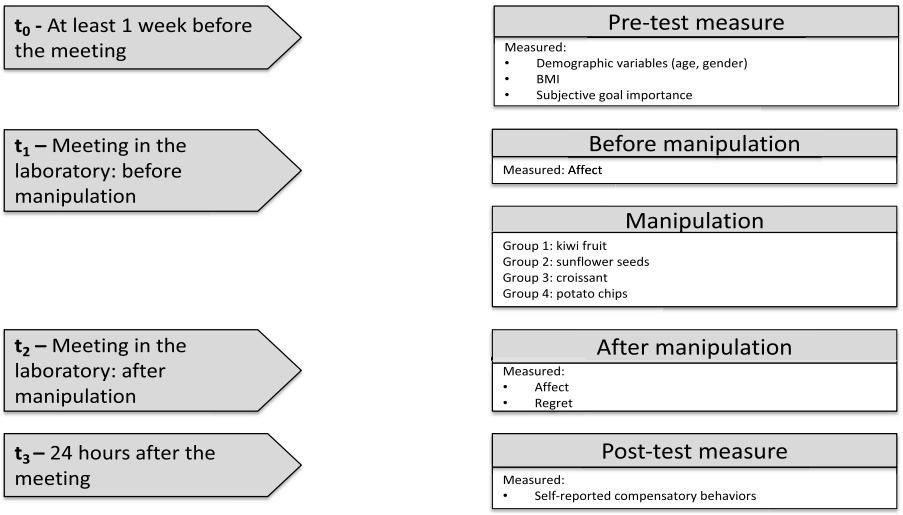

Fig. 1. Flowchart representing chronological stages of the study.

details concerning the procedures and gave informed consent.

At the baseline (t_0), the participants completed questionnaires including demographic variables, height, weight and a question about the subjective importance of the goal of being healthy, as well as other scales considering motivation and anticipated regret that are not addressed in this paper. At this stage, participants also provided their e-mail addresses for further contact and scheduled a meeting in the laboratory at least one week later.

Upon arrival at the laboratory (t_1), each participant was seated individually at a table and completed questionnaires including positive and negative affect, and reported whether they had an empty stomach or not. Then, all participants learned from the research assistant that they would take part in a marketing task that required eating some food products. Next, participants were asked whether there was anything that they could not eat for health reasons (e.g., due to allergies). A few participants could not consume lactose contained in the croissant. In this case, we served the next randomly assigned product.

The cover story given to participants was that they were taking part in a marketing task. The purpose of this task was to justify the situation in which participants were tasting different food products. An assistant brought four plates to each participant: yellow, green, red, and blue. Each plate contained a similar volume of one type of randomly assigned product. Depending on the condition, participants received kiwi fruit, sunflower seeds, mini croissants, or potato chips. Participants were told that the study concerned food preferences and that we were testing whether the color of the plate affects assessment of the product on it. The participants' task was to try the product from each of the four plates and evaluate it in terms of criteria such as taste, health, encouragement, aesthetics, and price, based on the procedure used by Fisher and Rangel (2014). The volume of products on the plates in each condition was similar. On average, the weight of the kiwi fruit was approximately 40 g; of the sunflower seeds - 18 g; of the mini croissants - 25 g; and the chips - 20 g. A research assistant weighed the plates with products before and after the marketing task, out of the sight of the participants.

After the marketing task, participants completed another set of questionnaires (t_2) including measurements of experienced regret and affect. At this point, the assistant reminded the participants that the study had one last stage, and that 24 h after the meeting, they would receive an email with the last questionnaire. At the post-test measure (t_3), participants received an online questionnaire measuring their compensatory health-related behaviors in the preceding 24 h, following the meeting in the laboratory.

After completing the study, participants were informed about the meaning of the manipulation used and the real purpose of the study. We debriefed them and explained that the marketing task was a part of the procedure to justify and give sense to eating various products. We shared with the participants the hypothesis that unhealthy products were supposed to evoke an experience of regret and then encourage compensatory behaviors.

As compensation for their efforts, each participant received a fruit water bottle worth roughly EUR 3 and was provided with more details about the research objective. The Internal Faculty Board of the first author's institution approved the experimental procedure (Decision 02/P/10/2018).

2.4. Measures

Inconsistency with the goal. Inconsistency with the goal of being healthy was manipulated by assigning participants to a situation in which they tasted either unhealthy or healthy products. It should be noted that such a manipulation of inconsistency is congruent with the operationalization of an action inconsistent with a goal proposed by Fishbach and Dhar (2005). In four experimental conditions, participants tasted either kiwi fruit, sunflower seeds, mini croissants, or potato chips. The products were selected in a pilot study to represent a spectrum from healthy product (kiwi), through moderately healthy (sunflower seeds) and moderately unhealthy (mini croissants), to unhealthy (potato chips).

The four products were selected in a pilot study conducted with 98 participants. Participants evaluated 40 different food products on a scale from unhealthy (1) to healthy (10). The four mentioned products differed in their perceived healthiness: kiwi ($M = 8.65$, $SD = 1.53$, 95% CI [8.31,8.98]) sunflower seeds ($M = 7.76$, $SD = 2.10$, 95% CI [7.29, 8.22]), mini croissants ($M = 3.67$, $SD = 1.99$, 95% CI [3.27, 4.07]), and potato chips ($M = 1.55$, $SD = 0.98$, 95% CI [1.36,1.74]). Additionally, participants were asked to evaluate how caloric the products were in their view (number of calories per 100 g). Again, the selected products could be ordered from the least to the most caloric: kiwi ($M = 100.00$, $SD = 61.36$, 95% CI [86.52, 113.48]), sun flower seeds ($M = 210.37$, $SD = 123.16$, 95% CI [183.30, 237.43]) mini croissants ($M = 261.22$, $SD = 117.43$, 95% CI [237.68, 284.77]) and potato chips ($M = 333.16$, $SD = 122.04$, 95% CI [308.70, 357.63]). Finally, the products did not differ in how tasty they were perceived (means ranged from $M = 6.86$ to $M = 7.80$).

Regret. We measured experienced regret with two items. One measuring a cognitive, counterfactual regret: "*If I could decide again, I would not take part in this study.*" Participants responded using a scale from "*I strongly disagree*" (0) to "*I strongly agree*" (9). The mean response

for counterfactual regret was $M = 1.43$ ($SD = 2.83$). The second was an affective and a straightforward regret: "*I regret that I took part in this study*". Participants responded using the same scale used for the counterfactual regret. The mean response for affective regret was $M = 1.03$ ($SD = 2.30$).

Compensatory behaviors. Compensatory eating behaviors over the preceding 24 h were measured with two items adapted from the General Health Behavior scale by Byrka and Kaiser (2013; for the rationale, see Kaiser, Byrka, & Hartig, 2010): "*I avoided fast food and semi-prepared meals*" and "*I avoided sweets (cakes, cookies, chocolate)*". Both items were found to be moderately positively correlated, $r(185) = .51$, $p < .001$. Participants responded using this scale: *no (1), rather not (2), rather yes (3)* and *yes (4)*. Additionally, we measured other compensatory behaviors regarding eating and physical activity that are not discussed in this paper.

Subjective goal importance. We measured the subjective importance of the goal of being healthy with one item, "*Reaching the goal of maintaining a healthy lifestyle is important to me.*" Respondents were asked to indicate how much they agreed or disagreed with that statement, using the scale from "*I strongly disagree*" (1) to "*I strongly agree*" (9). The mean response to this question was $M = 7.81$ ($SD = 1.17$).

Affect. The current affective state was measured using the International positive and negative affect schedule short-form (I-PANAS-SF) by Thompson (2007). It consists of five negative and five positive affective states. Participants responded using a scale from 1 to 5 where 1 stands for '*Not at all*' and 5 means '*A lot*'. Before manipulation, the mean for positive affect was $M_{t1} = 3.33$ ($SD = .72$), while after manipulation it was $M_{t2} = 3.27$ ($SD = .77$). Before manipulation, the mean for negative affect was $M_{t1} = 1.34$ ($SD = .55$), and after manipulation it was $M_{t2} = 1.34$ ($SD = .60$). The reliability analysis for all measures affect showed that the value of Cronbach's alpha was between 0.71 and 0.84.

Healthiness of the products. We measured how healthy given products appear to participants with one straightforward item. Participants responded on a scale from "*I strongly disagree*" (0) to "*I strongly agree*" (9).

Perceived goal inhibition. We measured perceived inhibition of the goal with one item: "*Participation in the study prevented me from achieving my health goal.*" Participants responded on a scale from "*I strongly disagree*" (0) to "*I strongly agree*" (9). The mean response was $M = 1.39$ ($SD = 2.47$).

Grams. We measured the amount of grams eaten by weighing the plates before and after participants tested the products. The means of grams eaten in all of the conditions were as follows: healthy (kiwi fruit) $M = 34.18$ ($SD = 26.70$), moderately healthy (sunflower seeds) $M = 7.62$ ($SD = 4.85$), moderately unhealthy (croissant) $M = 28.30$ ($SD = 17.52$), and unhealthy (potato chips) $M = 9.07$ ($SD = 11.64$).

Caloric intake. We calculated the amount of calories eaten based on the information on the number of grams eaten. The means of calories eaten in all of the conditions were as follows: healthy (kiwi fruit) $M = 20.51$ ($SD = 16.02$), moderately healthy (sunflower seeds) $M = 46.84$ ($SD = 29.81$), moderately unhealthy (croissant) $M = 126.20$ ($SD = 78.15$), and unhealthy (potato chips) $M = 48.96$ ($SD = 62.83$).

3. Results

3.1. Randomization check

Participants assigned to each group did not differ in a statistical sense in the primary demographic characteristics measured. The groups were homogenous with respect to gender $\chi^2(3, N = 185) = .26$, $p = .967$, age *K-W*$(3, 184) = 0.03$, $p = .999$, and BMI χ^2 $(6, N = 185) = 3.49$, $p = .745$. Similarly, the groups did not differ in the self-reported subjective goal importance, $F(3, 184) = 1.28$, $p = .285$, which confirms the effectiveness of random allocation to groups.

3.2. Manipulation check

Affect. We tested whether the reported affect changed under the manipulation. Analyses of repeated measurements showed a significant change in positive affect, $F(1, 180) = 4.27$, $p < .05$, $r^2_{effect} = 2\%$. Participants declared lower positive affect after the manipulation compared to before it. The main effect of the inconsistency manipulation was not significant, $F(3, 180) = 2.62$, $p = .052$, which was also the case for the interaction between positive affect and inconsistency with the goal, $F(3, 180) = .744$, $p = .527$. We found no significant change in negative affect, $F(1, 181) = .001$, $p = .976$, before and after manipulation, as well as the interaction between negative affect and inconsistency with the goal, $F(3, 181) = .995$, $p = .397$.

Healthiness of the products. Participants assigned to each group differed in a statistical sense in their perception of products as good for one's health, $F(3, 184) = 83.42$, $p < .001$. Post-hoc analyses with Bonferroni correction showed that participants eating kiwi fruit found it to be healthier ($M = 7.47$, $SD = 3.32$) than participants eating croissants ($M = 2.27$, $SD = 1.44$), $p < .001$ and potato chips ($M = 1.72$, $SD = 1.17$), $p < .001$. Participants eating sunflower seeds ($M = 6.95$, $SD = 2.59$) found them to be healthier than participants eating croissants ($M = 2.27$, $SD = 1.44$), $p < .001$ and potato chips ($M = 1.72$, $SD = 1.17$), $p < .001$. Differences between all the groups were significant. The linear contrasts analysis showed, as predicted, that the products kiwi and sunflower seeds were evaluated as more healthy than mini croissants and chips, $t = 12.66$, $p < .001$, $r^2_{effect} = 53\%$.

To test the sensitivity of the results we performed additional ANCOVA with healthiness of the products as a dependent variable, condition as independent variable, and caloric intake and grams as covariates. Including these covariates in the model did not affect the main effect of the conditions on perceived healthiness as the omnibus model remained significant, $F(3, 184) = 58.93$, $p < .001$, $r^2_{effect} = 50\%$. Caloric intake was not a significant covariate $F(1, 184) = 3.04$, $p = .083$, $r^2_{effect} = 2\%$, but grams eaten were found to be a significant covariate $F(1, 184) = 8.66$, $p = .004$, $r^2_{effect} = 5\%$.

Perceived goal inhibition. We conducted another omnibus univariate analysis of variance, this time with perceived goal inhibition as a dependent variable. It yielded a significant main effect of inconsistency with the goal, $F(3, 184) = 17.94$, $p < .001$, $r^2_{effect} = 30\%$. Post-hoc analyses with Bonferroni correction showed that participants in a healthy condition ($M = 0.10$, $SD = .31$) perceived goal inhibition to a lesser extent than participants in the moderately unhealthy ($M = 2.02$, $SD = 2.50$) and the unhealthy condition ($M = 2.96$, $SD = 3.34$), $p < .001$. Similarly, participants in a moderately healthy condition ($M = 0.26$, $SD = .92$) perceived goal inhibition to a lesser extent than participants in the moderately unhealthy ($M = 2.02$, $SD = 2.50$) and the unhealthy condition ($M = 2.96$, $SD = 3.34$). The linear contrast analysis showed the same pattern as in the case of regret, but the effect was even stronger, $t = 6.69$, $p < .001$, $r^2_{effect} = 21\%$.

We performed additional ANCOVA with perceived goal inhibition as a dependent variable, condition as independent variable and caloric intake and grams as covariates. Including these covariates in the model did not affect the main effect of the conditions on perceived goal inhibition as the omnibus model remained not significant $F(3, 184) = 14.11$, $p < .001$, $r^2_{effect} = 20\%$. Neither caloric intake $F(1, 184) = .01$, $p = .937$, $r^2_{effect} = 0\%$ nor grams eaten $F(1, 184) = .08$, $p = .779$, $r^2_{effect} = 0\%$ were found to be significant covariates.

3.3. Effect of acting inconsistently with the goal on regret

An omnibus univariate analysis of variance with counterfactual regret as a dependent variable yielded a significant main effect of the inconsistency with the goal manipulation, $F(3, 184) = 2.95$, $p < .05$, $r^2_{effect} = 5\%$. Post-hoc analyses with Bonferroni correction showed that participants in a healthy condition ($M = 0.56$, $SD = 1.65$) experienced significantly less regret than participants in the unhealthiest condition

($M = 2.33$, $SD = 3.66$), $p < .05$. Other differences between groups were not significant (see Fig. 2). Additionally, we performed an analysis of linear contrasts that confirmed the linear increase in means of experienced regret from the healthiest to the unhealthiest condition, $t = 2.63$, $p < .05$, $r^2_{effect} = 4\%$ (equal variance not assumed).

We additionally performed ANCOVA with counterfactual regret as a dependent variable, condition as independent variable and caloric intake and grams as covariates. Including these covariates in the model did not affect the main effect of the conditions on counterfactual regret, as the omnibus model remained significant $F(3, 184) = 4.23$, $p < .05$, $r^2_{effect} = 1\%$. Caloric intake was found to be a significant covariate $F(1, 184) = 6.82$, $p < .05$, $r^2_{effect} = 4\%$ but grams eaten were not a significant covariate $F(1, 184) = 3.19$, $p = .076$, $r^2_{effect} = 2\%$.

An omnibus univariate analysis of variance with affective regret as a dependent variable yielded no significant results, $F(3, 184) = 1.81$, $p = .147$, $r^2_{effect} = 3\%$. However, the linear contrasts showed the same pattern as in the case of counterfactual regret. The less healthy the tasted product, the higher the experienced regret, $t(184) = 2.21$, $p < .05$, $r^2_{effect} = 3\%$ (equal variance not assumed).

We performed additional ANCOVA with affective regret as a dependent variable, condition as independent variable and caloric intake and grams as covariates. Including these covariates in the model did not affect the main effect of the conditions on affective regret as the omnibus model remained not significant $F(3, 184) = 2.34$, $p = .075$, $r^2_{effect} = 4\%$. Neither caloric intake $F(1, 184) = 1.95$, $p = .165$, $r^2_{effect} = 7\%$, nor grams eaten $F(1, 184) = 1.93$, $p = .167$, $r^2_{effect} = 2\%$ were found to be significant covariates.

3.4. Effect of acting inconsistently with the goal on compensatory behaviors through regret

In the next analysis, we explored the relationship between inconsistency with the goal, regret, and compensatory behaviors. Specifically, we tested model 4 of the PROCESS macro (Hayes, 2017) with a bias-corrected bootstrapping procedure (10,000 samples). Inconsistency with the goal served as a causal antecedent (X), regret as a mediator (M), and self-reported compensatory behaviors at the post-test measure (t_3) as an outcome variable (Y). All variables were standardized before the analyses.

Inconsistency with the goal had a significant effect on regret; the unhealthier the product participants tasted, the more regret they experienced ($\beta = .18$, $t = 2.54$, $p < .05$, 95% CI [0.04, 0.33]). The higher the regret, the higher the chance of endorsing compensatory behaviors ($\beta = .16$, $t = 2.17$, $p < .05$, 95% CI [0.01, 0.31]). Most importantly, for the mediational hypothesis, the bootstrapped indirect effect for regret as a mediator was significant (0.03, $se = .02$, 95% CI [0.002, 0.07]).

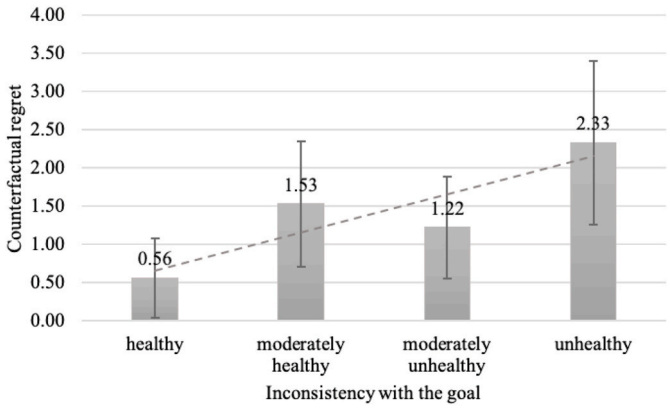

Fig. 2. Experience of counterfactual regret depending on inconsistency with the goal. Vertical bars represent 95% confidence. The dotted line represents linear contrasts.

3.5. Effect of acting inconsistently with the goal on compensatory behaviors through perceived goal inhibition and regret

Next, we performed a serial mediation model (model 6 in PROCESS macro) with the same antecedent (X) and an outcome variable (Y), but with perceived goal inhibition as an additional mediator (M_1). We expected that inconsistency would predict perceived goal inhibition, which itself would predict regret, which in turn would predict compensatory behaviors. As expected, inconsistency with the goal had a significant effect on perceived goal inhibition. That is, the more unhealthy the product that the participants tasted, the more they were convinced that taking part in the study inhibited their healthy goal ($\beta = .46$, $t = 6.99$, $p < .001$, 95% CI [0.33, 0.59]). We also found a path showing a link between higher perceived goal inhibition and higher experienced regret ($\beta = .29$, $t = 3.66$, $p < .001$, 95% CI [13, 0.45]). Finally, we found a marginally insignificant effect showing that the higher the level of regret, the more likely the engagement in compensatory behaviors would be ($\beta = .13$, $t = 1.68$, $p = .09$, 95% CI [-0.02, 0.28]). The indirect effect mediated by regret was insignificant (0.006, $se = .01$, 95% CI [-0.009, 0.03]), as was the indirect effects for perceived goal inhibition (0.06, $se = .04$, 95% CI [-0.008, 0.14]). The total indirect effect was significant (0.09, $se = .04$, 95% CI [0.012, 0.17]) (see Fig. 3). The results show that, in line with previous research, inconsistent actions had to be perceived by an individual to cause regret, as the perceived goal inhibition fully mediates the effect of inconsistency on regret.

3.6. Moderated mediation test of inconsistency with the goal on compensatory behaviors

Finally, we tested the moderated mediation hypothesis with model 7 of the PROCESS macro (Hayes, 2017) with a bias-corrected bootstrapping procedure (10,000 samples). The inconsistency of the goal had a significant effect on regret ($\beta = .16$, $t = 2.20$, $p < .05$, 95% CI [0.02, 0.30]). The effect of inconsistency of the goal on regret was not significantly moderated by subjective goal importance ($\beta = .11$, $t = 1.51$, $p = .13$, 95% CI [-0.03, 0.25]). Regret was positively related to compensatory behaviors ($\beta = .16$, $t = 2.17$, $p < .05$, 95% CI [0.01, 0.31]). Finally, the bootstrapped moderated mediation effect for regret as a mediator and subjective goal importance as a moderator was significant (0.03, $se = .02$, 95% CI [0.003, 0.06]). Specific results of the interaction showed, as expected, that more committed participants in the unhealthy conditions experienced more regret and, in turn, undertook more compensatory behaviors (see Fig. 4).

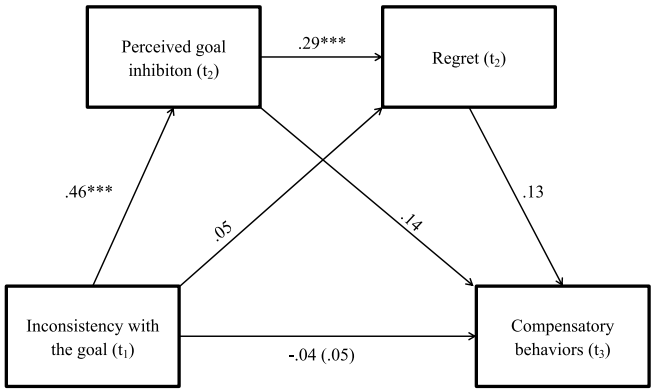

Fig. 3. The standardized regression coefficients for the effect of inconsistency with the goal on compensatory behaviors mediated by perceived goal inhibition and regret.

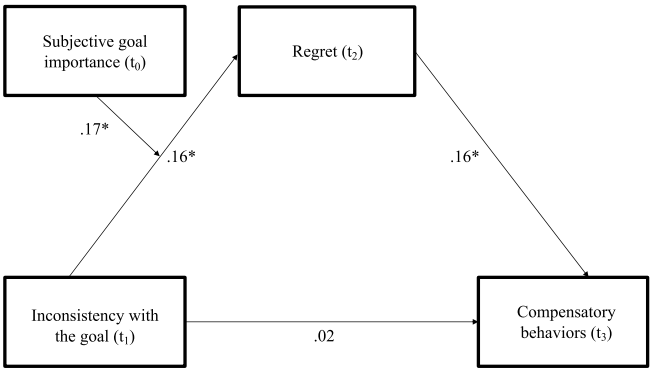

Fig. 4. The standardized regression coefficients for the effect of inconsistency with the goal moderated by subjective goal importance on compensatory behaviors as mediated by counterfactual regret.

4. Discussion

This study explored affective mechanisms underlying compensation after acting inconsistently with a goal. Specifically, we tested the role of experienced regret on people's engagement in compensatory health behaviors after tasting unhealthy products.

We found that acting inconsistently had a significant effect on experience of regret. Participants tasting unhealthy products experienced higher regret than participants acting consistently with the goal. Regret was found to be a significant mediator between inconsistency with the goal and compensatory health behaviors. This result is coherent with previous findings showing that skipping a scheduled workout leads to experiencing regret, and in turn triggers compensatory behaviors (Byrka et al., 2018; Byrka et al., 2020). In our study, we found the same mechanism in the sphere of eating behaviors, so that people who ate products that were inconsistent with the healthy goal experienced regret and, in turn, compensated by avoiding fat and sweets.

We also showed that inconsistency with the goal has a significant effect on perceived goal inhibition, which leads to a higher level of regret and undertaking compensatory behaviors. This relation between perceived goal inhibition and regret is coherent with the result showing that people have to perceive their actions as a cause of failure in order to experience regret (Zeelenberg & Pieters, 2004b). It is worth noting that, in this study, we did not ask about regret related to eating unhealthy food, but regret related to taking part in an experiment. Going back to the example from the introduction, we showed that not only regret related to a certain behavior, such as eating a piece of cake, but regret related to a situation, for example, inviting a neighbor, might lead to compensation and avoiding unhealthy food.

General affective regret was not affected strongly enough by the inconsistency with the goal manipulation to show significant differences between the groups, but we found expected linear contrasts showing the same pattern as in the case of counterfactual regret. We speculate that it might have been difficult for people to admit that they regretted taking part in a study while the study itself was still being performed. Another explanation is that the situation did not evoke strong affect. It appears that the situation in which participants tasted unhealthy products did not evoke strong emotions because the results of both regret measures were low (<3.0 on the 10-point scale). The absence of a significant effect of the inconsistency manipulation on positive and negative affect also confirms this interpretation. It appears that eating unhealthy products was not an overly aversive experience for our participants. Even though the participants did not intensely regret the situation, experienced regret was strong enough to act as a mediator and lead to undertaking compensatory behaviors.

Finally, we found that the importance of the goal moderated the effect of acting inconsistently on regret. In line with our predictions, perception of the goal as important enhanced experienced regret in situations where participants tasted unhealthy products (Van Dijk et al., 1999). This result is in line with previous findings by Fishbach et al. (2003) and Shah et al. (2002) that showed that the initiation of self-regulatory processes is more likely when pursued goals are perceived as important to individuals.

Our study has a few important limitations. First, we obtained information on the undertaken compensatory behaviors by way of self-reports. We believe that observing real compensatory behaviors would be even more valuable. The self-report form, however, was sufficient to measure compensatory health behavior important for that study. Low average scores of experienced regret may indicate that manipulation of inconsistency was not strong. Indeed, the effect sizes were not strong enough to yield all results significant. For example, the effect of inconsistency on affective regret was not significant. It should be noted that when we performed this analysis without dropouts at t_3, the results were significant. In that sense, the study was underpowered because of the dropouts at t_3.

Last but not least, our study was conducted in the laboratory, which hinders generalizability to real-life settings. Laboratory settings could have affected the amount that our participants consumed and resulted in a weaker inconsistency manipulation. It is worth replicating the study applying more ecologically valid designs.

Aside from new insights, our study also opens new avenues for research. In the future it is worth exploring if acting inconsistently with a goal translates into compensatory behaviors in domains other than food, such as hygiene or substance avoidance, which would indicate that this mechanism is more universal. Another question is whether similar mechanisms would work for active undertaking of compensatory behaviors (e.g., more exercise) as it worked for avoidance of unhealthy food, which seems to be a more passive and accessible form of compensation.

Past research has shown that exposition to physical activity leads to compensation by serving more calories in meals (Koenigstorfer, Groeppel-Klein, Kettenbaum, & Klicker, 2013; Werle, Wansink, & Payne, 2015). It would be interesting to see if this mechanism also works in the opposite way, so that eating more results in undertaking physical activity, and whether this can be explained by experienced regret.

Another line of research worth further exploration is experience of regret and engaging in compensation within individual differences and specific samples. For example, the manipulation of tasting food may trigger the need for consistency. In future research, it is worth considering the need for consistency as a controlled variable. One more interesting option is restrained eating. As has been shown so far, restrained eaters are characterized by concerns about weight, recurrent self-perception as a dieter, and tendency to experience guilt (Polivy, Herman, & Mills, 2020). It is likely that restrained eaters would be more sensitive than unrestrained eaters to manipulations of inconsistency, as past research has shown that when exposed to caloric food they overeat (see e.g., Polivy & Herman, 2020). They would probably experience higher levels of regret, as a very similar emotion, guilt, is foundational to restrained eating. Also, restrained eaters would probably be less likely to avoid fatty food and sweets by means of compensation as their self-regulatory processes are not as efficient as those of unrestrained eaters (Herman, Polivy, & Esses, 1987).

Future research should also focus on the length of time after which these compensatory behaviors appear. In our study, we collected data on compensation after 24 h after the manipulation of inconsistency with the goal. It seems an interesting avenue of exploration to collect information about undertaken compensatory behaviors on a regular basis, so as to capture their time dynamics. This kind of procedure may make it possible to answer the question of how much time is needed before one begins undertaking compensatory behaviors. It is worth noting that, in the above study, participants reported compensatory behaviors by indicating answers to given examples of activities. We believe that people may compensate in different areas, so it would be interesting to let them report compensatory behaviors by responding to an open

question. Moreover, it could be highly valuable to conduct a similar study in natural conditions, outside the laboratory, to collect data based on natural behaviors.

Taken together, our research extends the literature on compensatory health behaviors as a result of acting inconsistently with an important goal. We explored the affective mechanism of failure to engage in health consistent behaviors and compensatory reactions. In addition to existing research, we found that regret related to being in a situation that inhibits goal pursuit is an important factor in the process of compensation, particularly for those who perceive a certain goal as important to them.

Author contributions

The manuscript is original work of both authors (Katarzyna Byrka and Klaudia Sorys), both authors made a significant contribution to this study and all authors have approved the final version of the article.

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Publication of Studies 3.1 - 3.2

Self-regulatory Processes in Striving for Identity Goals: Self-incompleteness Shields Eco-friendly Vegans from Temptations

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Abstract

Grounded in the symbolic self-completion theory, the present research expands previous findings by testing the self-regulatory processes behind self-(in)completeness states. We hypothesized that the experience of incompleteness in the identity goal of being an eco-friendly vegan leads to refraining from temptations allowing to realize a hedonic goal. The experience of completeness, in contrast, was expected to prompt succumbing to temptations. We examined these effects for multiple decisions on a number of temptations following sequentially. Study 1 demonstrated that eco-friendly vegans who experienced incompleteness were less likely to choose non-ecological, attractive food products than vegans who experienced completeness and those who were in the control group. This effect was strongest for the first dish presented in a series of choices. In Study 2, we confirmed the findings of Study 1, showing that the effect was observed regardless of what dish was first presented. Additionally, we found that the effect of self-(in)completeness states held when controlling for relevant individual differences, that is, trait self-control and the pursuit of pleasure. We propose new avenues for research on self-completion theory in the contexts of self-regulation, temptations, and individual differences.

Keywords: self-completion, self-regulation, identity goals, temptations, self-control

Self-regulatory Processes in Striving for Identity Goals:
Self-incompleteness Shields Eco-friendly Vegans from Temptations.

Among the multiple goals that individuals pursue, some are particularly important to them and become central to the understanding of their identity. These so-called identity goals, such as becoming an eco-friendly person, can never be fully attained and individuals keep striving for these goals by engaging in self-symbolizing activities that are figurative or real means (Gollwitzer et al., 1982; Gollwitzer, 2018; Wicklund & Gollwitzer, 1981). Symbols can be self-evident and manifest themselves in obvious activities, such as using a Greenpeace-branded carrier bag. However, they may also be more subtle, such as a relevant positive self-description (Marquardt et al., 2016) or an expressed behavioral intention (Gollwitzer et al., 2009).

Self-defining goals, like any other goal, often stay in conflict with competing goals, including the pursuit of pleasure and comfort (Lindenberg & Steg, 2007; Vosgerau et al., 2020; Inzlicht et al., 2020). The pursuit of pleasure and comfort is written in human nature (Berridge & Aldridge, 2008; Young, 1952), and arising temptations may serve as means to attain hedonic goals. At the same time, they may interfere with and hinder the pursuit of self-defining goals (e.g., Giner-Sorolla, 2001). For example, a conflict arises when an environmentally concerned person tries to resist nonlocally grown delicacies.

Past research has shown that self-symbolizing intensifies when individuals experience a state of self-incompleteness (e.g., Longoni et al., 2014; Wicklund & Gollwitzer, 1981; 1982). In contrast, in the state of self-completeness, striving for the identity goal may pause (Doerflinger et al., 2021; Wicklund & Gollwitzer, 1981). The objective of the present research is to examine the self-regulatory processes behind the pursuit of self-defining goals. Thus far, the effect of self-(in)completeness states has not been examined in situations where

individuals must resolve the conflict of choosing to act on either the overarching identity goal or a competing hedonic goal activated in the here and now. However, as Kuhl (1987) has pointed out early on, successful goal striving is characterized by effectively controlling distractions coming from competing goals. So, we expected that alternative goals (e.g., hedonic goals) will be curbed more effectively when a person is in a state of incompleteness vs. completeness regarding a relevant aspired-to identity goal. We hypothesized that incompleteness in an identity goal to which people are highly committed will override a competing hedonic goal. Incompleteness should serve as a shield against temptations, and an environmentally conscious individual experiencing incompleteness should prefer using opportunities that serve the identity goal of being a pro-environmental person over those that serve the hedonic goal at hand. Individuals in the completeness state, in turn, should not show this preference.

Moreover, in the present research we aim to test the effects of incompleteness when facing several temptations in a row. Based on previous research, we expect that the effects of incompleteness are instantaneous and short lasting (Mahler, 1933; Sciara et al., 2022). Therefore, when exposed to multiple temptations, an incompleteness should provide a shield for the first one, but less so for the following ones.

Striving for Self-Identity Goals

Individuals experience desires almost half the time they are active, and desires turn into temptations when they remain in conflict with an important aspired-to goal (Hofmann et al., 2012). Pursuing conflicting goals in the long run might be harmful for well-being (Emmons & King, 1988) as such pursuit is stressful and aversive. Therefore, individuals employ various self-regulatory strategies, such as resisting temptations, to avoid or resolve goal conflicts (Inzlicht et al., 2020; Kruglanski et al., 2018). Self-regulation is a broad term for undertaking mental and behavioral activities (e.g., goal planning and implementation) that

facilitate the pursuit and allow for the attainment of aspired-to goals (Carver & Scheier, 2001; Kuhl, 2018).

According to the symbolic self-completion theory, identity goals are never fully attained. Still, individuals can subjectively experience states of completeness versus incompleteness. The state of completeness is associated with the feeling that the desired identity has been reached, and as a result, individuals no longer experience an urge to strive for the identity goal (Gollwitzer et al., 2009). When someone is convinced about possessing the characteristics that indicate the possession of the aspired-to identity, they are unlikely to engage in further self-symbolizing activities (Gollwitzer, 2018). In contrast, feelings of identity goal incompleteness occur in situations when committed individuals learn that their behaviors have distanced them from this identity. This incompleteness may be a result of negative feedback on efforts not being sufficient to achieve the identity goal. In that sense, incompleteness states are comparable to situations of experienced discrepancies as a result of feedback loops described in the control theory (Carver & Scheier, 1982). But feedback is not the only way to experience a shortage in self-symbols relevant to an aspired-to identity goal. Interruption of the identity goal striving or a recall of relevant failures have also been observed to induce feelings of incompleteness (Gollwitzer et al., 1982; Gollwitzer et al., 2013; Jordan et al., 2011; Marquardt et al., 2016; Wicklund & Gollwitzer, 1981). The state of incompleteness results in an unpleasant tension that needs to be reduced, and to do this, individuals undertake self-symbolizing activities as a means of compensation aimed at restoring completeness (Gollwitzer et al., 1982; Gollwitzer & Wicklund, 1985; Gollwitzer, 2018; Lalot et al., 2019; Moskowitz et al., 2011; Susewind & Walkowitz, 2020).

For example, Longoni et al. (2014) showed that environmentally conscious participants who received negative feedback about their non-ecological consumer choices were striving to achieve the identity goal of protecting the environment more intensively in the subsequent task. Specifically, they tried to overcome the experienced sense of incompleteness by segregating waste more carefully. However, environmentally conscious participants, who received favorable feedback on the environmental friendliness of their consumer choices, reduced the pursuit of their self-defining goal due to the already achieved completeness, and therefore recycled waste less carefully in the subsequent task.

Incomplete Self-Identity Goals Inhibit Alternative Goals

Longoni et al. (2014) also showed (Study 2) that environmentally conscious participants in an incompleteness state performed faster in a lexical decision task related to environmental issues than participants in the control group, whereas the participants in the completeness state performed slower on this task. The incompleteness also shortened the reaction times on recognizing green colors (associated with a sustained environment) compared to the control group, whereas the completeness extended the reaction times (Study 3). This implies that states of incompleteness and completeness, respectively, activate or deactivate the goals to which individuals are committed.

The activation and deactivation of goals has consequences for alternative goals in line with the goal system theory, according to which goals form associative networks (Kruglanski, 1996). Exposure to stimuli activating an important goal, such as words associated with this goal, reduce the accessibility of alternative goals (Shah et al., 2002). Participants whose focal goal was activated retained fewer alternative goals from their memories and required longer reaction times for alternative goals (Shah et al., 2002). Similar effects were found for self-

identity goals. In one of the studies reported by Sciara et al. (2022), it was observed that individuals in an incompleteness state show a reduced scope of attention. These results are in line with the theory of orienting vs. multiple perspectives, according to which strong commitments to attaining a given goal lead to orienting people towards their individual point of view and to narrowing their perceptual field (Pantaleo, 1997; Pantaleo & Wicklund, 2000; Wicklund, 1999; Wicklund & Brehm, 2004).

Although the effects of self-incompleteness in the face of a competing hedonic goal have not been explored before, Marquardt et al. (2016) have shown that experiencing incompleteness regarding an aspired-to identity goal (i.e., being a successful lawyer) can override the pursuit of being a moral person. Specifically, committed law students after experiencing incompleteness regarding their lawyer identity goal, endorsed immoral behaviors as long as these were seen as indicative of being a skillful lawyer. Given this striking finding, incompleteness in the identity goal of being an eco-friendly person should manage to override giving in to pleasurable temptations that are in conflict with being an eco-friendly person.

Sequential Self-Symbolizing and Resisting Multiple Temptations

Temptations rarely occur in isolation and individuals often have to make a series of self-regulatory choices in a row. This in turn may influence subsequent decisions regarding self-symbolizing and choosing temptations. The resource model by Baumeister et al. (2018) predicts that the ability to resist temptations may deplete and decrease over time. In consequence, in each subsequent choice, succumbing to temptations should become more likely. Vohs et al. (2008) found that participants, who had to decide multiple times between similar everyday products, were able to hold their arms in unpleasantly cold water for a

shorter time than the control group. In another study, participants, who made multiple decisions on choosing college courses by writing them down on a response sheet, were less persistent and spent less time practicing math problems. Inzlicht and Schmeichel (2012) in the process model of depletion propose that self-control depletion is associated with a motivational and attentional shift from the current goal requiring self-regulation to more enjoyable and pleasurable aspects of life. Theorizing based on the resource model suggests that overtime participants should be more likely to engage in temptations rather than in self-symbolizing regarding an important identity goal.

Similar predictions, but due to a different mechanism, stem from the self-completion theory and the classic studies of the Lewinian group on the consequences of interruption. According to Lewin (1926), after an individual sets a particular goal a tension system becomes and remains active until the goal is attained or until an individual "leaves the field," that is, stops goal striving altogether. According to Mahler (1933), if a certain task relevant to the goal is interrupted, an arisen tension leads individuals into substitute, compensatory actions related to the goal. In line with this assumption, Gollwitzer et al. (1982) found that participants who were interrupted when presenting themselves positively, described themselves in an even more positive light at the next occasion. Mahler (1933) also observed that performance of a given task related to the goal at hand reduces tension induced by the interruptions, and the urge to perform another goal-related task diminishes. A similar phenomenon was observed in research on cognitive dissonance; apparently, the magnitude of cognitive dissonance and related tension decreases with each consonant cognition that is added to people’s efforts to reduce dissonance (Festinger, 1962; Wicklund & Brehm,

1976/2013). Finally, Fishbach et al. (2006) point to a further relevant phenomenon; they observed that perceived goal progress translated into decreased engagement in goal striving.

Repeated self-symbolizing at multiple occasions has not been investigated extensively so far (for an exception see; Sciara et al., 2022), but the symbolic self-completion theory predicts that sequentially refraining from or succumbing to temptations will depend on whether individuals experience states of incompleteness or completeness. A state of incompleteness will lead to self-symbolizing on the first occasion. In subsequent occasions, however, the tension related to the experienced self-incompleteness should decrease and self-symbolizing should become less likely. Sciara et al. (2022) found that self-symbolizing by posting carrier-relevant information decreased goal orientation and narrowed the scope of attention. This additionally suggests that self-symbolizing diminishes goal activation and shielding against actions that conflict with the main goal. When individuals have not self-symbolized on the first occasion, they may still experience incompleteness, which in turn will heighten their readiness to self-symbolize. Those individuals should be more likely to resist temptations at subsequent occasions. Complete individuals on the other hand should not feel the urge to self-symbolize at any occasion.

Intensity of an Experienced Goal Conflict

Not every behavior which is pleasurable and hedonic in nature will be perceived by individuals as a behavioral failure of giving in to a temptation. Individuals perceive succumbing to temptations only when it violates a superordinate, long-term goal that is important to them and to which they are committed (Fishbach & Shah, 2006; Vosgerau et al., 2020). Acting inconsistently with an important goal manifests itself in feelings of regret in the face of self-regulatory failure (Sorys & Byrka, 2021; Valshtein & Seta, 2019; Vosgerau et al.,

2020). According to functional appraisal theory, affective states are signals for appraising people's current situation (Zeelenberg & Pieters, 2004). Regret is an emotion observed after failure to pursue a goal. For example, participants committed to the goal of being on a diet experienced higher regret after eating calorie-rich produce than those who had eaten healthy produce (Sorys & Byrka, 2021). Moreover, Becker et al. (2019) found in a series of studies that the stronger the conflict participants experienced as a result of giving in to an unhealthy but desirable temptation, the more intensely they felt post-decisional regret (Becker et al., 2019). In a different domain, students who reported bad study habits experienced higher levels of retrospective regret (Valshtein & Seta, 2019). In sum, retrospective regret seems to characterize choices in which individuals experience an intensive conflict between a long-term identity goal and a hedonic goal.

Relevant Individual Differences

Individuals differ in their ability to resolve goal conflicts (Duckworth et al., 2011; Duckworth et al., 2016). According to the theory of action versus state orientation (Kuhl, 1992; 1994), individuals who are capable to shield the current goal from competing goals are action oriented. They employ a number of strategies, such as attention control, emotion control, motivation control and environmental control to strive for the current goal. The action-oriented individuals concentrate on the planning and initiation of goal-directed action and use the listed strategies frequently and effectively. The state-oriented individuals fail to disengage from competing goals and are caught up in rumination (Kuhl, 1992; 1994).

A more outcome-focused perspective is offered by Baumeister (2002) and Tangney et al., 2004). Individuals manage to show self-discipline in the face of temptations and distractions are referred to as possessing high self-control. They are found to be more

successful resisting temptations, inhibiting or altering impulses, and overriding undesired behavioral tendencies (Baumeister, 2002; Milyavskaya et al., 2015; Tangney et al., 2004; Vosgerau et al., 2020). Finally, individuals are known to differ in the extent to which pleasure and hedonism are important in their lives (Bernecker & Becker, 2021). Hedonic goals are driven by the desire for pleasure and the fulfillment of desires (Hofmann & Van Dillen, 2012; Stroebe et al., 2008). This desire and the extent to which hedonic goals are central and important for individuals varies among them. A higher tendency to pursue pleasure relates to life satisfaction and well-being (Peterson et al., 2005). Hedonic experiences, including feeling good, being relaxed, and having fun, were however found to be negatively correlated with the ability to resist temptations (Giner-Sorolla, 2001). Individuals with higher levels of the pursuit of pleasure should favor hedonic means in identity goal-hedonic goal conflicts; that is, temptations are focused on rather than self-symbolizing requiring the shielding of temptations.

The Present Research

So far, research on the symbolic self-completion theory found that incompleteness states prioritize the pursuit of important identity goals (e.g., Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Wicklund & Gollwitzer, 1981). No study, however, has examined whether the behavioral consequences of experiencing incompleteness and completeness affect the resolution of goal conflicts – such as when determined eco-friendly individuals face hedonic temptations. Based on previous findings, we expected that experiencing incompleteness would focus individuals on the aspired-to identity goal and will thus facilitate inhibiting hedonic goals. In consequence, individuals should be more resistant to temptations opposing their identity goal than in the control and in the self-completeness condition.

We focused on the identity goal of being an eco-friendly vegan as environmental protection is reported to be one of the most important reasons for the transition to veganism, next to religious issues and weight control (Curtis & Comer, 2005). Vegans may self-symbolize their pro-environmental identity goals by choosing local products to minimize environmental pollution and carbon imprints due to transportation (Conrad, 2012). We expected that individuals who are committed eco-friendly vegans, when experiencing incompleteness, will be less likely to choose attractive and tasty non-ecological dishes compared to vegans in a completeness state and in the no-treatment control group.

In Study 2, we additionally validated the effects of the incompleteness manipulation controlling for individual differences such as self-control and the pursuit of pleasure. The two variables are relevant for self-regulatory failure and success and thus should be related to the preference for temptations, but should not affect the deactivation and activation of the aspired-to identity goal. Thus, we expected that the self-incompleteness manipulation would reduce succumbing to temptations beyond and above individual differences.

Furthermore, indirect evidence suggests that the effect of identity-goal incompleteness is instantaneous and impulsive. For example, in the study by Marquardt et al. (2016) incomplete lawyers engaged in immoral self-symbolizing without much reflection. Gollwitzer et al. (1982) found, in turn, that participants interrupted in their self-symbolizing efforts, immediately undertook further behaviors to compensate for their incompleteness. Incompleteness effects are also short-lived as shown by Sciara et al. (2022). Posting self-symbolizing content on Instagram, made participants experience less urge to self-symbolize. Accordingly, we hypothesized that self-symbolizing will be the most likely at the first opportunity after the incompleteness induction and then should diminish, as a single compensating action may be sufficient for restoring completeness. Self-symbolizing activities toward achieving an important goal should minimize energization to self-symbolize at

immediate subsequent occasions; the restored state of completeness mitigates the urge to engage in further self-symbolization. Therefore, on the first occasion, individuals should fail to resist temptations, but as self-completeness states are short lasting and instantaneous, they are expected to act in line with their goals in the subsequent decisions.

Finally, we aimed to confirm indirectly that participants facing temptations do experience self-regulatory conflict. One indicator of such a conflict is the intensity of experienced post-decisional regret. As regret involves counterfactual thinking stimulating reflection (Sijtsema et al., 2022), reflecting on past behavior should lead committed vegans to regret having acted inconsistently with their aspired-to identity goal. Accordingly, participants should experience more regret after choosing non-ecological, attractive temptations rather than an eco-friendly option, irrespective of the experimental condition.

Study 1: Self-(in)completeness and Tempting Non-ecological Dishes

Study 1 aimed at testing whether inducing incompleteness among vegans by providing negative feedback on their pro-environmental dietary choices related to their food practices causes them to refrain from more attractive hedonic but non-ecological dishes, such as sweet potato soup. We expected to observe these effects with the first dish, that is, the first choice, but less with the subsequent ones. Based on the literature suggesting that temptations are desires that conflict with an important goal (Vosgerau et al., 2020), we hypothesized that the choice of non-ecological, attractive temptations compared to the choice of ecological, but less attractive options will result in higher experienced post-decisional regret among eco-friendly vegans.

Methods

Study Design

We performed an online experiment with a random allocation to the self-(in)completeness condition (incompleteness vs. control group vs. completeness) as a between-

subject factor. The dependent variables were three choices of dishes (a choice of soup, a choice of burger, and a choice of dessert).

Participants

The initial sample consisted of 481 participants who met our primary criterion—that is, being at least 18 years old and declaring being on a vegan diet. The final inclusion criteria required participants to be committed to environmental protection as one of the most important characteristics of being a vegan. Since commitment to the goal was found to be crucial for self-regulatory processes (Fishbach & Shah, 2006; Vosgerau et al., 2020), we invited only participants who found the goal of taking care of the environment as an important motive to become vegan. To measure commitment to environmental protection, we asked the participants to indicate how much environmental protection motivated them to follow a vegan diet. Following the procedure used by Longoni et al. (2014) and Marquardt et al. (2016), we took the middle of the scale value as a cut-off point, that is 5 on the scale from 0 (‘*Not at all’*) to 10 (‘*A lot*’). This resulted in an exclusion of n =169 participants who provided responses equal to 5 or below or earlier dropped out from the study. Finally, 312 participants met all inclusion criteria, and data from this sample were further analyzed. The participants’ mean age was M = 27.96 (SD = 8.30), ranging from 18 to 59 years, and 85.30% (n = 266) were female.

A sensitivity analysis conducted with G*Power software (Faul et al., 2007) indicated that the sample size of N = 312 (given the 80% power) allows for the detection of the effect size of η^2 = .03 in the corresponding 3 x 1 factorial design for ANOVA, φ = .18 for 3 x 3 χ^2 tests, and η^2 = .02 for 2 x 1 Mann-Whitney tests. To calculate effect size for non-parametric tests we used the procedure introduced by Lehmann (2006), suggesting to compute the sample size required for a parametric test and add 15% to the sample size.

Procedure

Participants were recruited via announcements on the social media platforms of groups related to a vegan diet. After entering the study platform, they received details concerning the procedure and gave informed consent. Then, participants completed questionnaires that included demographic variables, such as age and gender, and confirmed that they were on a vegan diet. Those who reported not to be on a vegan diet were redirected to the end of the study. In the next part, the participants responded to a set of questions regarding their commitment to the goal of taking care of the environment and their motives for going vegan.

Then participants saw 20 different food products appearing in random order for each participant and indicated how often they consumed them. One-half of the products were local—that is, grown in the home country of Poland (e.g., beetroots, carrots, apples), and the other half contained products mass-imported from far abroad (e.g., coconuts, avocados, cashew nuts). After completing this part of the study, the participants were randomly assigned to one of three groups. The first group (the incompleteness condition = -1) received negative feedback on the sustainability of their eating behaviors, the second group (the control condition = 0) received information that they completed the first part of the study and were redirected to the next stage of the study, and the third group (the completeness condition = 1) obtained positive information on the sustainability of their choices.

Next, participants read a cover story reporting that the owners of a to-be-opened restaurant specializing in the preparation of vegan meals would like to test their potential menu. Participants were presented with the menu with three meals from the fictitious vegan restaurant (i.e., soups, burgers, and desserts). Their task was to choose one out of two dishes in three meals. For each meal, the participants had a choice between two options: a non-ecological, attractive choice (temptation) and an ecological but less attractive option. The order in which the dishes were selected was not random; each participant chose the soup first, then the burger, and finally the dessert. We used this order so that the research situation was

as close as possible to the real choices in the restaurant, and at the same time to increase the ecological validity of the study. Participants also evaluated each of the dishes in the following categories: environmental friendliness, attractiveness, and tastiness (for details, see Supplementary File D). Moreover, the participants were asked to describe their level of regret after their decisions. The questions were displayed after each choice of dish in the following order: regret, attractiveness, environmental friendliness, and the taste of the dishes.

After completing the study, the participants were informed about the aim of the manipulation and the real purpose of the study. We debriefed them and explained that the feedback on the ecological diet choices they received in the middle of the study was randomly assigned. To ensure that the participants were aware that they had been randomly assigned to experimental conditions, we asked them whether they understood the use of the manipulation.

The Ethical Review Board of the first author's institution approved the experimental procedure (Decision 03/P/01/2020).

Materials and Measures

(In)completeness Manipulation. Participants were assigned to the incompleteness, control, or completeness conditions before receiving bogus feedback on previously declared frequency of eating selected local (e.g., beetroots) and mass-imported products (e.g., coconut). Each group read a randomly generated message about food choices depending on the assigned condition. In the incompleteness condition, participants received feedback reading that their food choices were not fully in line with the lifestyle and values of vegans. The import of the products they eat contributes to high water consumption, deforestation, and leaves a carbon footprint. The picture attached to this message showed a burning planet. In the completeness condition, participants received feedback that their food choices are fully in line with the lifestyle and values of vegans and that products they eat contribute to saving water, not cutting forests, and minimizing the carbon footprint. The picture attached to this

message shows a planet in human hands. The control group received no feedback and was asked to proceed to the next stage of the study (for details, see Supplementary File A).

Temptations. For the purposes of the study, we created special graphics presenting a menu with two soups, two burgers, and two desserts. Each of the dishes was accompanied by a price, weight, and description to simulate the real menu as well as possible (for details, see Supplementary File B). The positions of the dishes in the menu were randomized for each participant. Participants had to choose between a non-ecological, attractive temptation (e.g., sweet potato soup) and an ecologically less attractive dish (e.g., beetroot soup). As temptations, we aimed to select hedonic food products that were characterized by aesthetic, sensual pleasure, and high reward value (Cramer & Antonides, 2011; Dhar & Wertenbroch, 2000; Otterbring et al., 2023). Therefore, in the descriptions of non-ecological, attractive temptations, we used wordings related to aesthetics and pleasure, such as "velvety sweet potato cream soup." The description of ecologically less attractive dishes was plain without additional superlative adjectives (e.g., "red beet-root cream soup") and contained less favored but locally grown ingredients (e.g., caraway seed or garlic).

To select pictures and descriptions following our requirements, we performed a pilot study that allowed us to select three categories of dishes and two meals inside each category that differed in the level of perceived environmental eco-friendliness and attractiveness. The pilot study also showed the likelihood of choices between dishes in each category, indicating that non-ecological, attractive temptations were more eagerly chosen. Ecologically less attractive soups and desserts were perceived as more eco-friendly than non-ecological, attractive temptations (for details, see Supplementary File C).

To observe the tendency of the participants' choices, we summed up the number of non-ecological, attractive temptations chosen by the participants for three dishes. As the distribution of the variable did not deviate from normal, we used parametric tests (for details

see Supplementary Materials File D). Participants could score from 0 to 3 (M = 1.41, SD =.92), ρ_{KR20} = .45. The low value of reliability is a consequence of only 3 items used to calculate the score and likely differences in individual food preferences which contributed to additional variance. To observe sequential effects, we analyzed each decision separately.

Post-decisional Regret. We measured post-decisional regret with a single item, '*Please indicate how much you would regret your choice, if you really made one.*' Participants responded using the scale from '*Not at all'* (0) to '*Very much*' (10). As the distribution of the variable did deviate from normal (for details see Supplementary Materials File D), we decided to perform non-parametric tests (Field, 2013, p. 540) and present the medians for regret in the analyses.

For participants who chose non-ecological, attractive temptations, the median response for soup was *Mdn* = 1.00, for burger was *Mdn* = 1.00, and for dessert was *Mdn* = 1.00. For participants who chose the ecological, less attractive option, the median response for soup was *Mdn* = 0.00, for burger was *Mdn* = 1.00, and for dessert was *Mdn* = 1.00.

Results

Effect of Self-(in)completeness on Temptation Choices

Participants assigned to each condition differed significantly in the number of temptation choices, $F(2, 260) = 3.14$, $p = .045$, $\eta^2 = .02$ (see Figure 1). We performed two planned contrasts to address specific hypotheses related to the experimental conditions. The first contrast showed that participants in the incompleteness condition (contrast value = -1) chose fewer temptations (M = 1.22, SD = .88) than participants in the completeness condition (contrast value = 1; M = 1.57, SD = .94), (contrast value for the control condition = 0), $t(258) = 2.51$, $p = .013$, $\eta^2 = .02$. The second contrast showed that participants in the incompleteness condition (-1) did not significantly differ in the number of temptation choices from the control

condition, (contrast value = 1), (the completeness condition = 0), $t(258) = 1.44$, $p = .150$, $\eta^2 = .01$.

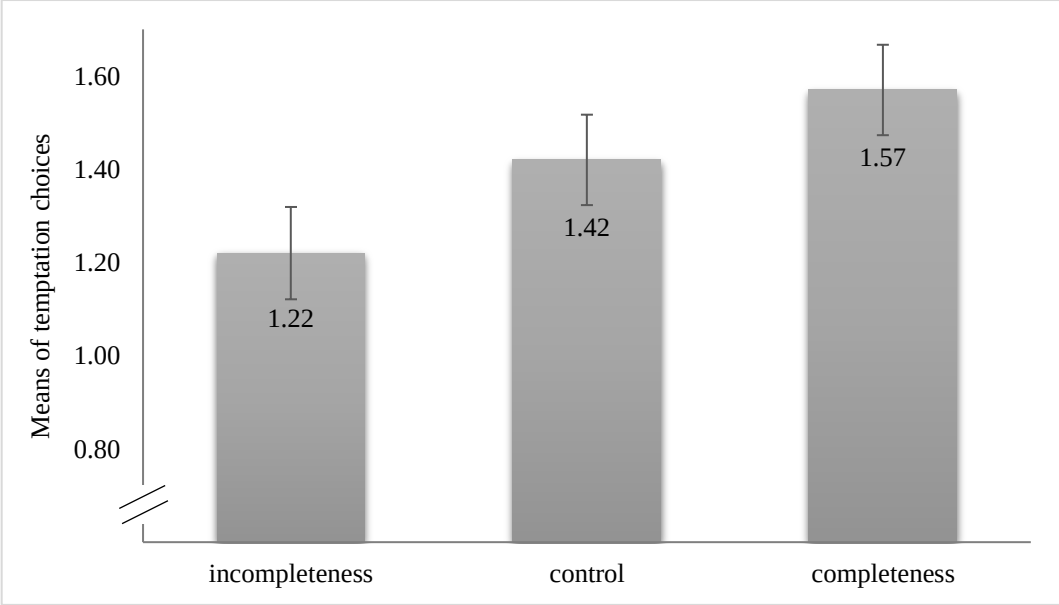

Figure 1. Means of temptation choices in the three experimental conditions. Error bars indicate +/- 1 standard error.

Effect of Self-(in)completeness Manipulation on Sequential Choices

Effect of Self-(in)completeness Manipulation on the First Choice. A *chi-square* test of independence was performed to examine the effect of the manipulation on the first choice (soup). Participants assigned to each condition differed in a statistical sense in the soup choice between the non-ecological, attractive temptation and the ecological less attractive option, $\chi^2(2, N = 261) = 6.04$, $p = .049$, $\varphi = .152$ (see Figure 2). As predicted, participants in the incompleteness condition chose the non-ecological, attractive temptation (i.e., the sweet potato soup) less often (43.6%) than participants in the completeness condition (60.2%) and in the control group (60.0%). Participants in the completeness condition chose the non-ecological, attractive option marginally more often than participants in the control condition.

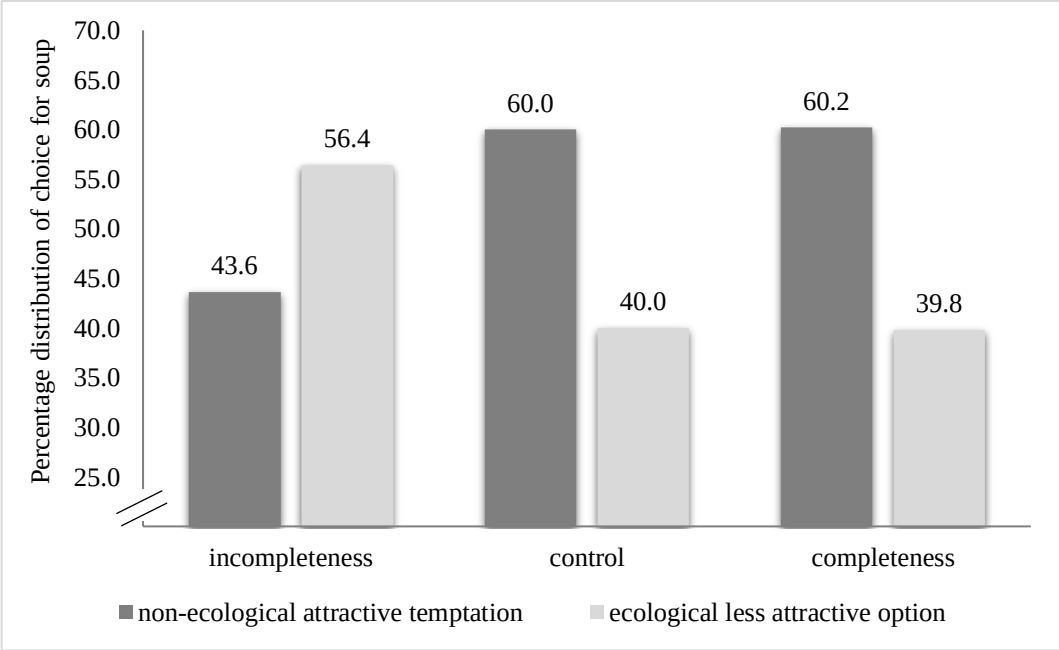

Figure 2. The proportion of choices of the non-ecological, attractive temptation (sweet potato soup) and the ecological but less attractive option (beetroot soup) in the three experimental conditions (Study 1).

Effect of Self-(in)completeness Manipulation on the Second Choice. A *chi-square* test of independence was performed to examine the effect of manipulation on the choice of burger. Participants assigned to each condition did not differ in a statistical sense in the likelihood of choosing non-ecological, attractive temptation and the ecological but less attractive option, $\chi^2(2, N = 239) = 2.77$, $p = .251$, $\varphi = .108$.

Effect of Self-(in)completeness Manipulation on the Third Choice. Participants assigned to each condition did not differ in a statistical sense in the dessert choice between the non-ecological, attractive temptation and the ecological less attractive option, $\chi^2(2, N = 233) = .47$, $p = .790$, $\varphi = .045$.

After correcting for multiple testing with Holm-Bonferroni correction (Abdi, 2010), none of the *p*-values remains below the conventional $p = .05$ level (recurrent corrected *p*-

values: p = .138; p = .488; p = .357). More importantly, the effect size is the strongest for the first choice and diminishes with each decision.

Post-decisional Regret

To test the hypothesis that the choice of the non-ecological, attractive temptation compared to the choice of the ecological, but less attractive option will result in higher post-decisional regret, we carried out Mann-Whitney tests.

In the first choice of soup, post-decisional regret after the choice of the non-ecological, attractive temptation (*Mdn* = 1.00) was higher than post-decisional regret after the choice of the ecological, but less attractive option (*Mdn* = 0.00), $U(N_{temptation}= 141, N_{nontemptation}= 116) = 6943.50$, z = -2.21, p =.027, η^2 = .02. Post-decisional regret after the choice of the non-ecological, attractive burger (*Mdn* = 1.00) was the same as post-decisional regret after the choice of an ecological, less attractive option (*Mdn* = 1.00), $U(N_{temptation}= 135, N_{nontemptation}= 101) = 6561.00$, z = -.52, p =.602, η^2 = .01. In the third choice of dessert, post-decisional regret after the choice of the non-ecological, attractive temptation (*Mdn* = 1.00) was the same as post-decisional regret after the choice of the ecological but less attractive option (*Mdn* = 1.00), $U(N_{temptation}= 89, N_{nontemptation}= 141) = 6201.00$, z = -.16, p =.875, η^2 = .01.

Discussion

Study 1 provided evidence that the experience of incompleteness leads to less frequent temptation choices inconsistent with the aspired-to identity goal. Participants who experienced incompleteness resulting from having received negative feedback on their food choices were less likely than complete participants to choose non-ecological, attractive temptations. In the incompleteness condition, over 16% less participants chose non-ecological, attractive temptations on the first occasion as compared to the control and the completeness condition. In line with our predictions, we noticed this effect only for the first choice (i.e., the soup). The second and third choices of burger and dessert, respectively, did

not manifest effects of the self-completion state. Participants in the completeness and in the control condition only marginally differed in the decision about the first choice. Possibly, the participants in the control group after indicating the frequency of consuming eco-friendly products felt that they had reached the aspired-to goal and thus did not feel the urge to undertake self-symbolizing activities anymore.

Study 1 demonstrated as well that post-decisional regret was higher for the non-ecological, attractive temptation than for the ecological, less attractive option but only for the first choice. As for the choice of burger and dessert, the level of post-decisional regret did not differ between the non-ecological, attractive temptation and the ecological but less attractive option. These findings suggest that the perceived conflict between the self-defining goal of protecting the environment and pursuing a hedonic goal is the most apparent at the first choice but then diminishes on the following occasions.

In Study 1, we aimed to make the decision making as ecologically valid for participants as possible, and for this, we did not randomize the order of meals. As in a real restaurant, the soups came as the first, the burgers the as second, and the desserts as the third choice. However, this procedure may have affected the observed results. We cannot be entirely certain that the stronger effect of the manipulation on the first choice does not stems from the specificity of the soups. We addressed this limitation in Study 2.

Study 2: Self-(in)completeness, Tempting Non-ecological Dishes, Self-Control, and Pursuit of Pleasure

In Study 2, we formulated the same hypotheses regarding the states of incompleteness and completeness as in Study 1. However, we changed the procedure for presenting meals; they were now presented in random order. When interpreting sequential temptation choices, we could thus take into consideration the order in which the meal was presented and not only what kind of meal it was.

In Study 2, we additionally measured individual differences of self-control and the pursuit of pleasure. Individuals high in the trait of self-control are better at shielding long-term goals from the pursuit of conflicting hedonic goals (Baumeister et al., 2007; Hofmann et al., 2012). In a longitudinal field study, higher self-control was found to be related to better impulse control, for instance, more successful diet regulation or the absence of alcohol abuse patterns (Hofmann et al., 2012; Tangney et al., 2004).

We hypothesized that self-control and the pursuit of pleasure would be valid predictors of the temptation choices in our experiment, which would validate that the choices that participants made had a self-regulatory relevance. At the same time, we expected that shielding effects deriving from the state of incompleteness should be observed beyond and above these individual differences, as these states activate the important aspired-to identity goal in conflict with the hedonic goal. We expected that the effects of the experience of incompleteness and the experience of completeness on temptation choices will remain significant even after the introduction of self-control and the pursuit of pleasure as covariates.

Methods

Study Design

We performed an online experiment with a random allocation to the state of self-completeness condition (incompleteness vs. control group vs. completeness condition) as a between-subject factor. The dependent variables were three choices of dishes (first, second, and third choice of dish, regardless of the type of dish).

Participants

As in Study 1, participants were recruited via announcements on the social media platforms of groups related to vegan diet. The initial sample consisted of 355 participants who met the primary inclusion criterion—that is, being at least 18 years old and declaring being on a vegan diet. Out of these, 219 participants met the inclusion criteria of being committed to

environmental protection. We used the same cut-off point as in Study 1, also following the procedure by Longoni et al. (2014) and Marquardt et al. (2016). All procedures of Study 2 and the exclusion criteria were pre-registered at the following link https://aspredicted.org/zm9un.pdf. The age of the participants in the final sample ranged from 18 to 68 years (M = 31.79, SD = 8.81), and 74.00% (n = 162) were female.

Prior to the study, we conducted power analyses using G*Power software (Faul et al., 2007). Frequencies found in Study 1 showed that, collected the sample size of N = 219 (given the 80% power) allows for the detection of the effect size of η^2 = .04 in the corresponding 3 x 1 factorial design for ANOVA, φ = .21 for 3 x 3 χ^2 tests and η^2 = .03 for 2 x 1 Mann-Whitney tests.

Procedure

In Study 2, we repeated the procedure from Study 1 with three modifications. First, during the task of choosing three dishes, we introduced a random order of dishes. That is, participants were presented with soup, burger, and dessert displayed in random order. Second, we changed the order of display of questions in such a way that participants made three choices in a row. After that, they saw every dish once again and answered questions regarding regret, attractiveness, environmental friendliness, and taste (for details, see Supplementary File E). Finally, we measured self-control and the pursuit of pleasure in the last part of the study, right before the debriefing session.

Materials and Measures

(In)completeness Manipulation. Participants in the incompleteness or completeness condition received feedback on their performance as vegans based on the frequency of eating selected local and mass-imported products. As in Study 1, each group received a message with the conclusion of their food choices, and the picture complemented this conclusion.

Temptations. We used the same exact material for Study 2 as for Study 1. Participants chose between a non-ecological, attractive temptation and an ecological, less attractive option in a restaurant menu. To measure the choices, we summed up the number of non-ecological, attractive temptations chosen by participants for the three dishes. Participants could score from 0 to 3, and the mean score was M = 1.50 (SD =.93), ρ_{KR20} = .15. The low value of reliability is a consequence of only 3 items used to calculate the score, differences in individual food preferences and possibly variability arising from an unusual order of presenting dishes (e.g., some participants had to decide about dessert before deciding on the soup). Additionally, we measured each decision separately. As the distribution of the variable did not deviate from normal, we used parametric tests (for details see Supplementary Materials File D).

Post-decisional Regret. We measured post-decisional regret with a single item, '*Please indicate how much you would regret your choice if you really made one.*' Participants responded using the scale from '*Not at all'* (0) to '*Very much*' (10). As the distribution of the variable did deviate from normal (for details see Supplementary Materials File E), we decided to perform non-parametric tests (Field, 2013, p. 540) and present the medians for regret in the analyses.

For participants who chose non-ecological, attractive temptations, the median response for soup was *Mdn* = 1.00, for burger was *Mdn* = 1.00, and for dessert was *Mdn* = 1.00. For participants who chose the ecological, less attractive option, the median response for soup was *Mdn* = 0.00, for burger was *Mdn* = 1.00, and for dessert was *Mdn* = 1.00.

Self-control. We measured self-control using the self-control scale (SCS) developed by Tangney et al. (2004). It consists of 36 items concerning control over a wide range of behaviors (e.g., '*I am good at resisting temptations', 'Pleasure and fun sometimes keep me from getting work done', 'I am able to work effectively toward long-term goals')*. Participants

responded using the scale from '*Not at all'* (1) to '*Very much*' (5). The mean response was *M* = 3.50 (*SD* =.61), and Cronbach's α =.91.

The Pursuit of Pleasure. We used the *life of pleasure* subscale from the Orientations to Happiness Scale (Peterson et al., 2005), which consists of six items (e.g., '*Life is too short to postpone the pleasures it can provide*', '*I go out of my way to feel euphoric*', '*I love to do things that excite my senses*'). Participants responded to the scale from '*Not like me'* (1) to '*Very much like me*' (5). The mean response was *M* = 3.19 (*SD* =.81), and Cronbach's α =.81. Self-control and the pursuit of pleasure were moderately correlated in the expected direction, $r = -.39$, $p < .001$.

Results

Effect of Self-(in)completeness on Temptation Choices

Participants assigned to each condition differed significantly in the number of temptations chosen: $F(2, 194) = 5.06$, $p = .007$, $\eta^2 = .05$ (see Figure 3). As in Study 1, we performed two planed contrasts. The first contrast showed that participants in the incompleteness condition (contrast value = -1) chose fewer temptations (*M* = 1.19, *SD* = .88) than participants in the completeness condition (contrast value = 1; *M* = 1.57, *SD* = .95), (contrast value for the control condition = 0), $t(192) = 2.34$, $p = .020$, $\eta^2 = .03$. The second contrast showed that participants in the incompleteness condition (-1) chose fewer temptations (*M* = 1.19, *SD* = .88) than in the control condition (contrast value = 1; *M* = 1.70, *SD* = .89), (the completeness condition = 0), $t(192) = 3.08$, $p = .002$, $\eta^2 = .05$.

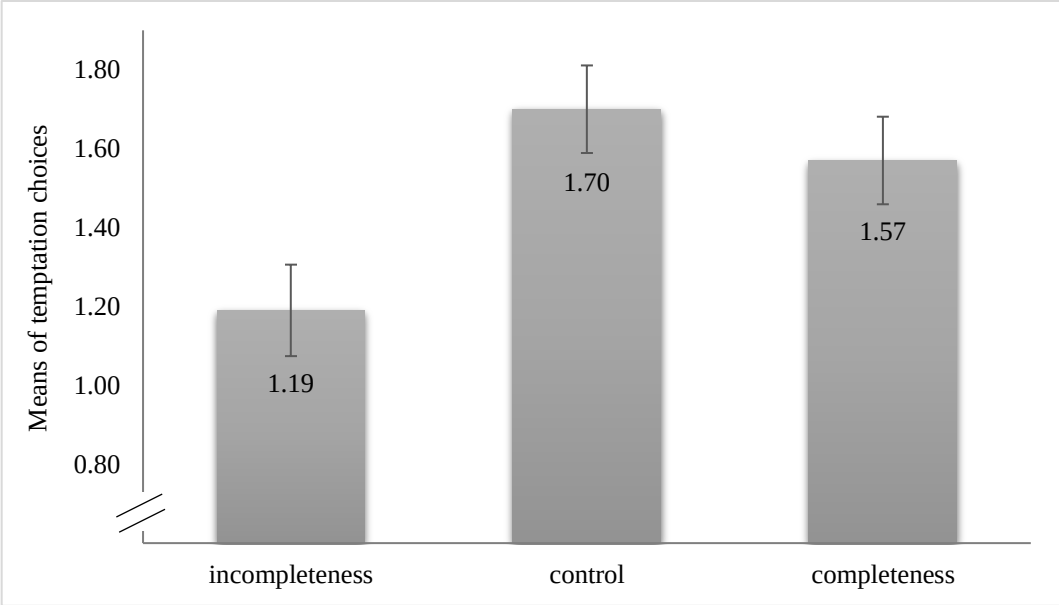

Figure 3. Means of temptation choices in three self-(in)completeness conditions. Error bars indicate +/- 1 standard error.

Effect of Self-(in)completeness Manipulation on Sequential Choices

Effect of Self-(in)completeness Manipulation on the Choice of First Dish. A *chi-square* test of independence was performed to examine the effect of the manipulation on the choice of the first dish. Participants assigned to each condition differed in the choice of the first dish between the non-ecological, attractive temptation and the ecological but less attractive option $\chi^2(2, N = 195) = 11.24$, $p = .004$, $\varphi = .240$ (see Figure 4). As predicted, participants in the incompleteness condition chose the non-ecological, attractive temptation, regardless of the type of meal, less often (31.6%) than participants in the completeness condition (58.1%) and in the control group (57.8%). The pattern of results in the completeness group did not differ from that of the control group.

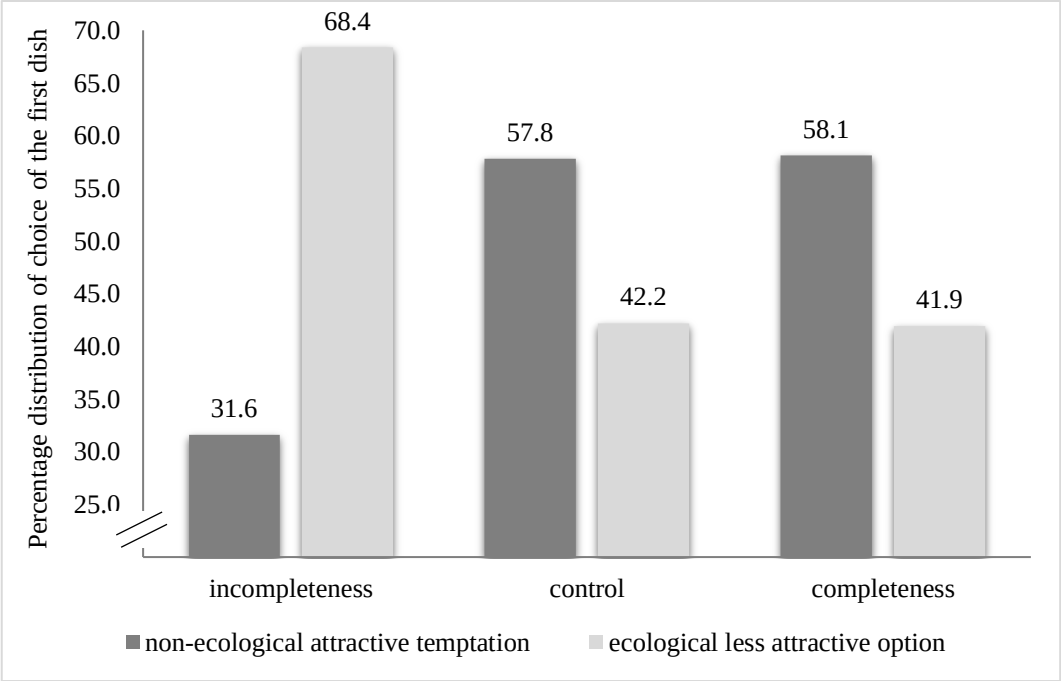

Figure 4. The proportion of choices of the non-ecological, attractive temptation and ecological less attractive option in the three conditions (Study 2).

Effect of Self-(in)completeness Manipulation on the Choice of the Second Dish. A *chi-square* test of independence was performed to examine the effect of the manipulation on the choice of the second dish, regardless of the type of meal. The participants assigned to each condition did not differ statistically in the likelihood of choosing non-ecological, attractive temptations and ecological, less attractive options, $\chi^2(2, N = 193) = 4.47$, $p = .107$, $\varphi = .152$.

Effect of Self-(in)completeness Manipulation on the Choice of the Third Dish. A *chi-square* test of independence was performed to examine the effect of the manipulation on the choice of the third dish, regardless of the type of meal. Participants assigned to each condition did not differ statistically in the likelihood of choosing non-ecological, attractive temptations and ecological but less attractive options, $\chi^2(2, N = 193) = .673$, $p = .714$, $\varphi = .059$.

After correcting for multiple testing with Holm-Bonferroni correction (Abdi, 2010), only the *p*-values for the first choice remain significant (recurrent corrected *p*-values: $p = .012$; $p = .214$; $p = .714$). Again, the effect sizes diminish with each decision.

Post-decisional Regret

To test the hypothesis that the choice of non-ecological, attractive temptation compared to the choice of ecological but less attractive option will result in higher post-decisional regret, we carried out Mann-Whitney tests.

In the first choice, post-decisional regret after the choice of non-ecological, attractive temptation (*Mdn* = 1.00) did not significantly differ from the regret after the choice of an ecological but less attractive option (*Mdn* = 0.00), $U(N_{temptation}= 76, N_{nontemptation}= 85) = 2858.00$, $z = -1.34$, $p = .180$, $\eta^2 = .01$.

In the second choice, post-decisional regret after the choice of the non-ecological, attractive temptation (*Mdn* = 1.00) did not differ significantly from post-decisional regret after the choice of the ecological less attractive option (*Mdn* = 1.00). A Mann-Whitney test indicated that this difference was not statistically significant, $U(N_{temptation}= 91, N_{nontemptation}= 72) = 2755.50$, $z = -1.82$, $p = .069$, $\eta^2 = .02$.

In the third choice, post-decisional regret after the choice of non-ecological, attractive temptation (*Mdn* = 1.00) was the same as post-decisional regret after the choice of ecological, less attractive option (*Mdn* = 1.00). A Mann-Whitney test indicated that this difference was not statistically significant, $U(N_{temptation}= 78, N_{nontemptation}= 80) = 3067.50$, $z = -.19$, $p = .847$, $\eta^2 = .01$.

The Role of Self-control and the Pursuit of Pleasure

To validate our findings when controlling for relevant variables, we performed an additional ANCOVA with temptation choices as a dependent variable, condition as an independent variable, and self-control and the pursuit of pleasure as covariates. Including these covariates in the model did not affect the main effect of the conditions on the number of chosen temptations, $F(2, 163) = 4.50$, $p = .013$, $\eta^2 = .05$. Self-control was not a significant covariate, $F(1, 163) = 2.33$, $p = .129$, $\eta^2 = .01$, but the pursuit of pleasure was found to be

significant, $F(1, 163) = 4.13$, $p = .044$, $\eta^2 = .03$. The higher the pursuit of pleasure the higher the likelihood that participants chose the temptation.

Discussion

Study 2 confirmed and extended the results of Study 1. As in Study 1, incompleteness led to less frequent succumbing to temptations inconsistent with an important goal compared to completeness states. In Study 2, this difference was also observed for the control condition. At the first dish choice, over 26% more participants who experienced incompleteness chose non-ecological, attractive temptations compared to the completeness and the control conditions. Consistent with Study 1, the proportion of participants choosing temptation from the first option did not differ between the control and the completeness group. Noteworthy, these results evinced despite the change in the order in which the different dishes were displayed. Again, we observed this effect only for the first dish, regardless of which type of meal was presented.

In Study 2, we introduced two individual difference variables relevant for resolving self-regulatory goal conflicts: self-control, and the pursuit of pleasure. We found no significant effect of the self-control trait, but the pursuit of pleasure was associated with more frequent temptation choices. One of the explanations for why a self-control trait was not a significant covariate in the whole model whereas the pursuit of pleasure was, is that the former captures a more general construct than the latter, and the construct of such a broad scope had an effect too weak to detect with the sample size we had. More importantly, the individual differences did not fully explain succumbing to temptations in our study. The effect of experienced incompleteness and completeness on choices of hedonic food remained significant beyond and above relevant variables such as self-control and the pursuit of pleasure.

For all three choices of dishes, the level of post-decisional regret did not differ between the non-ecological, attractive temptation option and the ecological but less attractive option. Still, for the first choice, the medians mirrored the results in Study 1. The lack of significant differences might be due to a smaller sample size in Study 2 and likely the shrinkage of variance due to floor effects. In general, participants did not regret much of their choices; medians ranged from 0 to 1 on a five-point scale. These low scores of post-decisional regret might be due to the participants' having to make hypothetical and non-real choices. Nonetheless, past research has shown that experienced regret related to the consumption of products inconsistent with an important goal is quite low, even when real and not hypothetical choices are involved (Sorys & Byrka, 2021).

General Discussion

The objective of the present research was to examine people's coping with conflict between an aspired-to identity goal of being a green person and an antagonistic hedonic goal. We concentrated on the effects of induced incompleteness on individuals' shielding of food temptations inconsistent with the pursuit of an aspired-to identity goal of being a green person. Both reported studies confirmed that the experience of incompleteness makes succumbing to hedonic temptations less likely and leads to undertaking behaviors consistent with the aspired-to identity goal. So far, past research has shown that incompleteness leads to intensified pursuit of an aspired-to identity goal when an opportunity to self-symbolize is encountered (Gollwitzer et al., 1982; Gollwitzer & Wicklund, 1985; Gollwitzer, 2018; Longoni et al., 2014; Marquardt et al., 2016) and that self-symbolizing effectively minimizes a person's respective goal orientation in general (Sciara et al., 2022). Enriching these findings, our results suggest that in a state of incompleteness, people are not only enhancing the pursuit of the aspired-to goal, they also inhibit the execution of activities that hamper this goal pursuit.

We also found that the effect of incompleteness on refraining from giving in to temptations is short lasting. Self-symbolizing activities toward achieving an aspired-to goal diminish even when relevant occasions to self-symbolize come up. The urge to self-symbolize is not permanent, and it appears that, in line with classic works on interruption (Lewin, 1926; Mahler, 1933), a single compensatory action may be sufficient for restoring a sense of completeness.

Moreover, the experience of conflict was fading away with each decision as indicated by the amount of post-decisional regret. In Study 1, it was higher after giving in to temptation rather than after the further pursuit of the aspired-to identity goal. However, this was true only for the first encounter with temptation. We found a similar pattern of results in Study 2, but the differences there were not significant, likely due to a smaller sample size. In line with previous findings, the experience of regret was linked to engaging in behavior inconsistent with an important goal (Sorys & Byrka, 2021; Valshtein & Seta, 2019). A decrease in perceived conflict with each subsequent decision could be explained with the effect of satiation. For example, Otterbring (2019) found that satiated participants made fewer hedonic food choices than did participants who came hungry to the laboratory. Interestingly, Larson et al. (2014) observed that the sensation of satiation increases with repeated choices of food products when these choices are only hypothetical and food is presented on pictures. These results suggest that effects of satiation appear even if real products are not present and participants are not physiologically satiated.

We extended our results of Study 2 by exploring individual differences, such as self-control and the pursuit of pleasure. The pursuit of pleasure was associated with a preference for temptations, but self-control turned out to be unrelated. Likely, the instrument we selected to measure self-control was too broad in scope to translate into preference of specific food temptations with the sample we had. More specific constructs such as hedonic capacity, that is

ability to successfully pursue a hedonic goal, might be better predictors of preference for hedonic foods (Bernecker & Becker, 2021). Specifically, the subscale of hedonic success should be related to the preference for aesthetic hedonic dishes, as it captures ability to relax and go astray from focal goal pursuit. Based on recent findings (Wenzel et al. 2022), self-regulatory strategies and orientations contingent with the different types of self-control conflicts are more effective for goal conflict resolution. Self-regulatory success is a function of individual differences and the situations at hand. We focused on inhibition as the type of goal conflict of interest, but other types such as action initiation and persistence still warrant research attention in the context of identity goal pursuit.

When generalizing our findings, it is worth noting some limitations. First, the participants made choices in a hypothetical situation in an online setting. We believe that real-life choices measured by observations would be even more valuable than mere declarations made by the participants. We admit that the hypothetical decision making minimizes social reality, which is known to enhance the effects of self-(in)completeness states (Pantaleo, 1997; Pantaleo & Wicklund, 2000; Wicklund & Gollwitzer, 1982). Probably, having to make real decisions would also increase experienced conflict between the goals. Still, the choices made in a hypothetical situation were sufficient to measure succumbing to temptations in our studies. Moreover, since the study was conducted during the COVID-19 pandemic, ordering food online was a more common event at the time than going out to a restaurant. Even though we acknowledge the value of field experiments, in this particular time we found online studies as a more ecologically valid option.

Second, our samples were composed mostly of women. This high proportion of women, however, mirrored the proportion of vegans and persons engaged in environmental protection in the general population (Trocchia & Janda, 2003). It is still warranted though to explore diverse samples and different domains in which conflicts between identity and

hedonic goals occur, including identity goals such as being healthy or being a good parent. In the present research, we focused on two goals in conflict, but for some identity goals, such as being a “party goer”, realization of the hedonic goal may be facilitating for the realization of this primal identity goal. In such cases, we should observe cross-goal self-symbolizing dependent on which self-symbols will be available (see e.g., Doerflinger et al., 2021).

And finally, future research may also aim to compare participants committed to environmental issues with non-committed ones, in order to better understand the striving for completeness in this identity goal. Moreover, we focused on commitment as a relatively stable and more of a trait-like variable. Recent research suggests that commitment to a short-term task goal can be induced on the spot by giving participants’ the liberty to choose a task (Falk et al., 2022; Gendolla et al., 2021), and such induced short-term commitments, in turn, manage to shield task performance from incidental affective influences. The potential of induced commitments to shield an individual from temptations when striving for an identity goal however still needs respective experimental research.

Future research should explore self-regulatory processes related to the pursuit of aspired-to identity goals over time by using more powerful designs. Our analysis was limited to three independent tests with a dichotomous outcome and forced decisions. Such a design cannot account for the variability in individuals’ behaviors, such as the possibility of inaction leading to not choosing any option. Moreover, perceived conflict between competing goals is a subject of intra- and inter-individual exchanges and should be studied accordingly (Wennerhold & Friese, 2022). Conducting longitudinal studies with multiple measurement points would allow us to capture the exact dynamics of the processes taking place in the pursuit of conflicting goals.

To summarize, our research extends the literature on symbolic self-completion, focusing on conflicts between aspired-to identity goals and temptations originating from

hedonic goals. We found that incompleteness is helpful to persist in shielding one's striving for identity goals from temptations whereas completeness is not. However, the positive effects of incompleteness on a person's readiness to self-symbolize seem to be rather short lasting.

This makes one wonder what "complete" individuals can do to protect their identity goals from interference by competing goals. The literature on effective goal striving suggests that people can engage in powerful self-regulation strategies. For instance, people can engage in the self-regulation activities that Kuhl (1992; 1994) has delineated in action-oriented individuals: preoccupation, hesitation, and volatility. Individuals may also engage in the self-regulation strategy of mental contrasting (i.e., juxtaposing the desired outcomes of one's goal pursuit with the obstacles that might be encountered on the way to goal attainment, such as slacking off). This mental exercise has been found to strongly commit people to their goals and to help them exert effective and efficient goal striving when facing critical obstacles (Oettingen, 2014). Or people may form relevant implementation intentions (i.e., if/when – then plans; Gollwitzer, 1993; 1999) that prospectively spell out what should be done on the spot if/when obstacles are encountered (e.g., If/when I am slacking off because I just have been successful, then I will increase my efforts to stay on track!). Mental contrasting and making if/when – then plans are particularly effective when they are combined in one self-regulation strategy called MCII (Oettingen & Gollwitzer, 2009).

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Manuscript based on Studies 4.1 - 4.4

The States of Self-incompleteness Direct Individuals' Preference towards More Instrumental Symbols.

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Authors' note

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Abstract

Grounded in the self-completion theory, the present research investigates whether experience of self-incompleteness in the identity goal of being a committed runner results in choosing more instrumental symbols for an important goal compared to experience of self-completeness. In four studies, different samples (N = 625) of committed runners decided between more or less instrumental symbols. Study 1 and Study 2 demonstrated that runners who experienced incompleteness were more likely to choose the more instrumental roller than runners who experienced completeness. In Study 3, participants were deciding between two sport applications. We confirmed the findings of Study 1 and Study 2 and extended them by showing that engagement of effort required to use symbols was found to be concurrent with instrumentality. In Study 4, we introduced social reality manipulation. Results showing effect of self-(in)completeness manipulation on choice of the symbol was confirmed, but we did not find social reality a significant predictor. We discuss effectiveness of self-symbolization in different contexts.

Keywords: self-completion, self-symbols, identity goals, instrumentality, effort, social reality

The States of Self-incompleteness Direct Individuals' Preference towards More Instrumental Symbols.

To achieve desired goals, individuals have to engage in activities that serve their purpose. Imagine a committed athlete who aims to stay in good shape. In order to attain this goal, he or she may go for a run in the evening, go to the gym before the job, keep nutritious diet, avoid sweets and salty snacks or develop routines by watching videos of other athletes online. All these activities certainly accomplish the goal of staying in good shape, but they are not effective for this goal to the same degree. Putting it metaphorically "All roads lead to Rome" but not all roads are equally good, or in goal-pursuit terminology, equally instrumental to the goal. According to the goal-systems theory, different means can lead to the same end-state, but their instrumentality (or subjective utility) depends on many factors such as circumstances, expectancy of attainment, expenditure of effort, or commitment (Kruglanski et al., 2002).

Some long-term goals are never achieved as they have no clear end-state, e.g., being a healthy person. Individuals aspire to these goals by taking up symbolic means. According to the self-completion theory symbols "are building blocks of a person's self-identity embedded in a social context" (Wicklund & Gollwitzer, 1982). Symbols as indicators of possessing an aspired-to self-definition can take variety of forms e.g., titles, professions, self-descriptions, job positions, behaviors or membership in selected interest groups (Gollwitzer et al., 1982; Wicklund & Gollwitzer, 1981). Failing short of symbols leads to self-incompleteness state and intensifies compensatory self-symbolizing (e.g., Sorys et al., in press; Wicklund & Gollwitzer, 1981; 1982). Experiencing self-completeness leads to lesser engagement in self-symbolization (Doerflinger et al., 2021; Wicklund & Gollwitzer, 1981).

Despite solid evidence on individuals' urge for self-symbolizing in incompleteness states, it is not known whether individuals differentiate symbols in the extent to which they allow for the accomplishment of identity goals. So far, employed research paradigms, testing the assumptions of the self-completion theory, have not tested situations in which individuals had to choose between valid symbols.

We hypothesized that the experience of self-incompleteness will increase the likelihood of choosing the symbols that are more instrumental for an important goal compared to the state of self-completeness. Specifically, we expected that highly committed runners in the state of self-incompleteness will be more likely to choose symbols that are more instrumental for their running goal, than highly committed runners in the state of self-completeness.

Self-symbolization in Goal Striving

The self-completion theory posits that people strive for self-definitions to which they aspire and are committed to, i.e., being a violinist, a father or a scientist (Wicklund & Gollwitzer, 1982). Striving for self-definition depends on the possession of symbols - indicators of one's accomplishments in regard to an aspired-to identity. Symbols are diverse, they can be subtle e.g., an expressed behavioral intention (Gollwitzer et al., 2009) or simple self-description (Marquardt et al., 2016; Wicklund & Gollwitzer, 1981), but they can also be very obvious e.g., garbage recycling by a person committed to being green (Longoni et al., 2014). Self-symbolizing activities are undertaken when individuals lack symbols, so when they experience a state of incompleteness (Wicklund & Gollwitzer, 1981). Committed individuals experience the state of incompleteness when they are convinced that undertaken behavior is not in line with an important goal. On the other hand, the state of completeness, is a result of the belief that undertaken symbols bring a person closer to a desired identity.

The state which individuals experience affects subsequent behaviors. The state of incompleteness leads to an unpleasant tension requiring its reduction. To do so, individuals prioritize the pursuit of important identity goals and engage in self-symbolizing behaviors aimed at restoring completeness (Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Sorys et al., in press; Wicklund & Gollwitzer, 1981). In the state of completeness, the feeling that the aspired-to identity has already been reached, results in the reduction of the urge to strive for the identity goal (Gollwitzer et al., 2009) and less engagement in further self-symbolizing activities (Gollwitzer, 2018).

Self-symbols can be considered as means, which are tools used by individuals to pursue their goals in the theory of goal systems (Kruglanski et al., 2002). Symbols compared to means are way more figurative and subtle. Even a single expression of intention as self-symbolization may be sufficient for rebuilding the state of completeness (Gollwitzer et al., 2009). Means are more concrete and tangible, understood as any activities perceived as contributory to the attainment of the goal (Shah & Kruglanski, 2003).

In comparison to the theory of goal systems, the theory of symbolic self-completion highlights the importance of social reality in striving for self-definitions. Symbols represent a meaning which sets off a universal reaction in others e.g., wearing a symbolic running shoe communicates to others that physical activity is an important part of individual's identity (Wicklund & Gollwitzer, 1982). Past research has shown that individuals committed to an identity goal undertake less self-symbolizing activities as a result of other people taking notice of their behavioral intentions, which indicates that social reality fosters the state of completeness (Gollwitzer et al., 2009).

Instrumentality of Self-Symbols

So far, the instrumentality of symbols has not been tested. When selecting means, individuals assess how beneficial the accessible behaviors are for the desirable goal, i.e., how

instrumental for the goal these means are. Mahler (1933) understood instrumentality as a "humanly visible work". In the classic research on interruption, she proposed that if a certain task relevant to the goal is interrupted, an arisen tension leads individuals into substitution of compensatory actions related to the goal. Mahler points in the same work that substitutes differ in their degree of reality, that is instrumentality in contemporary terminology. She wrote: "*Talking* is usually regarded as a less real action than *acting*, *thinking* as a less real action than *talking*" (Mahler, 1933, p. 32). The symbolic self-completion theory refers to substitution as changing forms of self-symbolizing aimed at achieving desired self-definition e.g., redirecting actions focused on broadening the knowledge of running into focus on high performance during workout routine (Wicklund & Gollwitzer, 1982).

Individuals take up symbols that are available and at hand (Doerflinger et al., 2021; Spychalska-Waszek, 2023). Nonetheless, they have a whole spectrum of symbols from which they may choose to strive one goal and there are some factors regulating preference for means' choice. In the goals systems theory, means which give the greatest expectancy of attainment are most likely to be chosen (Kruglanski et al., 2002). To maximize the goal attainment, individuals tend to choose more instrumental means.

Striving for goals rarely comes with ease and usually requires effort to overcome difficulties on the way to accomplish these goals. Effort affects choices of means and being complexed in nature is called a paradox, based on being costly from one side and adding value from the other one (Inzlicht et al., 2018). On the one hand, individuals favor means which require the least effort (Schwarz, 2004). Cognitive dissonance theory predicts that individuals who experience tension prefer the easiest means such as reformulation of beliefs. More effortful means, however, appear more instrumental and effective in attaining a goal (Labroo & Kim, 2009) and add value to these goals (Inzlicht et al., 2018).

Effortful means are perceived as more instrumental in the context of goal pursuit. According to "instrumentality heuristic", difficult experience may be judged positively if it helps to achieve a particular goal (Labroo & Kim, 2009). Individuals form positive perceptions of complexity if they assess a means as challenging and worth pursuing. For example, the chocolate ad difficult to read was perceived by participants as more instrumental for goal of gaining pleasure, than the ad easy to process (Labroo & Kim, 2009). Similar pattern for was found for avoidance goal (e.g., preventing obesity) - unpleasant mean i.e., a bitter-flavored substance, was perceived as less enjoyable and more instrumental at the same time (Hennecke et al., 2019). In another study, the more pain participants experienced during getting a tattoo, the more instrumental this activity was perceived. Similarly, mouthwash perceived as causing painful burning sensation was found to be connected with higher perception of instrumentality for a goal of preventing sore throat (Schumpe et al., 2018).

The Present Research

So far, research has found that means which require effort (Labroo & Kim, 2009), fit goal's orientation towards approach or avoidance (Hennecke, 2019) and cause pain (Schumpe et al., 2018) are perceived as more instrumental. In general, instrumental means are preferred by committed individuals in the process of goal pursuit as they allow effective goal attainment. The preference for instrumental symbols is less obvious, because of their figurative nature. Since the mere expression of behavioral intention may serve and be good enough as a symbol (Gollwitzer et al., 2009), the effort often accompanying instrumental solutions might swing preference towards symbols easier to enact.

At the same time, the experience of incompleteness was found to shield individuals from options irrelevant to the goal (Sciara et al., 2022) or conflicting with the goal (Sorys et al., in press). Based on these findings, we expected that experiencing the state of

incompleteness would increase the likelihood of choosing more instrumental symbols compared to the state of completeness.

So far studies' designs have not captured situations in which individuals had to choose between two or more available symbols in the incompleteness states.

In Study 1 (n = 110), we tested the hypothesis that committed runners experiencing incompleteness, will be more likely to choose more instrumental symbols for their running goal, compared to runners in a completeness condition. In Study 2 (n = 142) we formulated the same hypothesis, but expected that individuals will be able to distinguish the symbols in terms of their instrumentality. Study 3 (n = 173) examined the same effects as in Study 1 and Study 2 with a different set of symbols and explored perceived effort in realizing more and less instrumental symbols. As predictions of the self-completion theory focus on highly committed individuals, we expect that when having to choose in the state of incompleteness individuals would prefer more instrumental symbols, even if they perceive them as more effortful. In Study 4 (n = 200) we explored the same effects, but introduced social reality manipulation. We hypothesized that effect of self-(in)completeness manipulation on symbol choice will be qualified by social reality in such a way that in the social reality condition the difference in the likelihood of choosing more instrumental option in the incompleteness condition compared to completeness condition will be larger than in the no social reality condition.

To be able to generalize our findings, we designed the studies differently in regards to manipulations and dependent variables. In Study 1 we presented bogus feedback to participants, while in studies 2, 3 and 4 we asked participants to recall a situation regarding their recent physical activity. In Study 1 and Study 2 participants chose between two products for runners – a thermal mug and a massage roller. For Study 3 and Study 4 we designed special graphics presenting two different applications for runners.

Study 1: Self-(in)completeness and Symbol Choice

Study 1 aimed at testing whether inducing incompleteness among committed runners by providing negative feedback on their performance in undertaking physical activity would direct them to choose a more instrumental symbol, such as massage roller. We also hypothesized that inducing completeness among committed runners by providing positive feedback on their performance in undertaking physical activity will lead to the choice of less instrumental symbol, such as thermal mug.

Method

Study design

We performed a 2 × 1 online experiment with random allocation to the self-(in)completeness condition (incompleteness condition vs. completeness condition) as a between-subject factor. The dependent variable was a choice of a gift (less instrumental vs. more instrumental).

Participants

The initial sample consisted of 555 volunteers who entered the study platform. The inclusion criteria allowed us to select health-conscious participants engaged in undertaking physical activity. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being active minimum 75 minutes of vigorous physical activity per week. Those who declared this activity, confirmed being at least 18 years old and gave informed consent were included in the study.

Of the initial 555 participants n = 110 participants met the inclusion criteria and data from this sample were further analyzed. These participants' mean age was M = 41.24 (SD = 13.49), ranging from 19 to 77 years, and 62.70% (n = 69) were female.

As this was the first study in a series, we had no ground to predict effect sizes and run the power analysis. Therefore, we conducted the sensitivity analysis with G*Power software

(Faul et al., 2007) after the study. It indicated that the sample size of $N = 110$ (given the 80% power) allows for the detection of the effect size of $\varphi = .27$ for 2 x 1 χ^2 test.

Procedure

Participants were recruited via a Polish research platform Ariadna. After entering the study platform, participants received details concerning the procedure and gave informed consent. Firstly, participants confirmed that they undertake required physical activity and meet our inclusion criteria. All of the participants who denied undertaking at least 75 minutes of vigorous physical activity per week were redirected to the end of the study.

In the first part of the study, participants completed questionnaires including demographic variables such as age and gender and indicated their commitment to the goal of undertaking physical activity. In the next part, participants were asked to report their physical activity undertook in the last 7 days among 9 different activates, such as running, swimming, strength training, bicycling, dancing, playing tennis, stretching, walking and housework. After this, participants were randomly assigned to one of two conditions and received bogus feedback on their performance in undertaking physical activity, compared to other participants of the study. Participants in the incompleteness condition received negative feedback on their performance, saying that participant's result ranks him or her in 1st quadrant, which is worse than the result of 75% of the participants in the study. Participants in the completeness condition obtained positive information on their performance, saying that participant's result ranks him or her in 4th quadrant, which is better than the result of 75% of the participants in the study.

Subsequently, participants were presented with two potential gifts for participation in the study. Their task was to choose which one of those two they would take home if they could. One product, which is thermal mug, represented a less instrumental symbol for the goal

and other product, which is massage roller, represented a more instrumental symbol for the goal. The order of products was randomized.

In the last part of the study, we asked if participants found the feedback they received credible and if they already had any of the products presented as gifts in this study. After completing the study, participants were informed about the aim of the manipulation used and the real purpose of the study. We debriefed them and explained that the feedback on the physical activity performance they received in the middle of the study was randomly assigned. To make sure that the participants were aware that they had been randomly assigned to experimental condition, we asked them a question whether they understood the use of the manipulation.

The Ethical Review Board of the first author's institution approved the experimental procedure (Decision 12/P/04/2022).

Materials and Measures

(In)completeness Manipulation. Participants were assigned to the incompleteness or completeness condition before receiving bogus feedback on previously answered questions about frequency of undertaking different types of physical activity. Each group read a randomly generated message with the conclusion of their performance and saw a picture complementary with this conclusion. In the incompleteness condition, participants received feedback reading that as a result of comparing their responses with the responses of other participants, who are just as committed to the running goal as they are, we receive the information that their result places them in 1st quarter, i.e., it is worse than the result of 75% of the survey participants. In the completeness condition, participants received mirrored feedback, reading that their result places them in 4th quarter, i.e., it is better than the result of 75% of the survey participants (for details, see Supplementary File A).

Symbol choice. For the purposes of the study, we chose graphics presenting two products as symbols (for details, see Figure 1 and Supplementary File C). To measure symbol choice, we asked participants to choose between symbol less instrumental for a goal (thermal mug) and more instrumental for a goal (massage roller) with a single item '*Which of above would you choose as a gift for participating in the study?*'. In the whole sample, 44.50% of participants (n = 49) chose thermal mug and 55.50% of participants (n = 61) chose massage roller.

To select symbols, we performed two pilot studies to select two symbols different in perceived instrumentality. Pilot Study 1 allowed us to find two the most suitable symbols (i.e., massage roller and thermal mug) out of eight tested in form of the gifts for runners. In Pilot Study 2 we tested only those two symbols. Pilot Study 2 confirmed the results of Pilot Study 1, showing that massage roller was perceived as e.g., better product to help become a better runner, better tool to achieve the goal related to jogging and more motivating product for a runner than a thermal mug (for details, see Supplementary File B).

less instrumental symbol
(thermal mug)

more instrumental symbol
(massage roller)

Figure 1. Less and more instrumental symbols used in Study 1 and Study 2.

Results

Randomization Check

Participants assigned to each group did not differ in a statistical sense in the primary demographic characteristics measured. The groups were homogenous with respect to gender $\chi^2(1, N = 110) = 1.77$, $p = .183$ and age $K\text{-}W(1,110) = 0.04$, $p = .848$. As the distribution of the commitment to the goal deviated from normal (for details see Supplementary Materials File H), we decided to perform non-parametric tests (Field, 2013, p. 540). Similarly, there was no difference in the commitment to the goal between incompleteness ($Mdn = 8.17$) and completeness ($Mdn = 7.67$) condition, $U(N_{\text{incompleteness}} = 60, N_{\text{completeness}} = 50) = 1389.00$, $z = -.669$, $p = .504$, which confirms the effectiveness of random allocation to groups.

Effect of Self-(in)completeness on Symbol Choice

A *chi-square* test of independence was performed to examine the effect of the manipulation on the choice of the symbol. Participants assigned to each condition did differ in a statistical sense in the symbol choice between less instrumental symbol (a thermal mug) and more instrumental symbol (a massage roller) $\chi^2(1, N = 110) = 3.32$, $p = .052$ (one-tailed), $\varphi = -.174$ (see Figure 2). As predicted, participants in the self-incompleteness condition chose more instrumental symbol (massage roller) more often (63.3%, $n = 38$) than participants in the self-completeness condition (46.0%, $n = 23$). In line with our prediction, participants in the self-completeness condition chose less instrumental symbol (thermal mug) more often (54.0%, $n = 27$) than participants in the self-incompleteness condition (36.7%, $n = 22$).

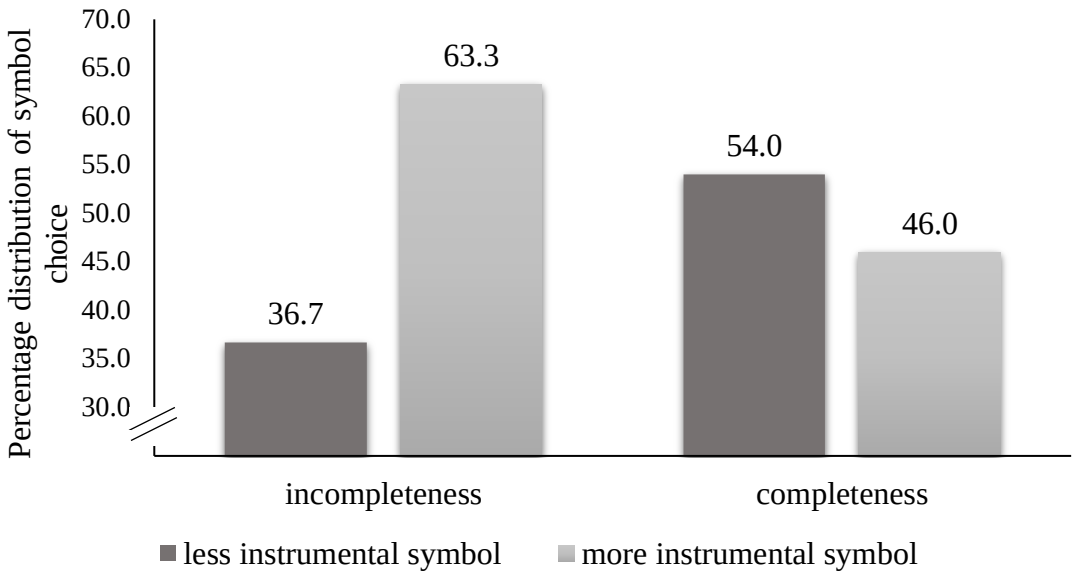

Figure 2. The proportion of choices of the symbols in the two experimental conditions (Study 1).

Discussion

Study 1 demonstrated that self-completion states have an impact on the choice of a symbol. The experience of incompleteness conduced to more frequent choice of more instrumental symbol, while the experience of completeness results in more frequent choice of less instrumental symbol. Runners who experienced incompleteness resulting from having received negative feedback on their recent physical activity performance were less likely than runners in completeness condition to choose less instrumental symbol; instead, they more often chose symbol more instrumental for their goal. Reversely, participants who experienced completeness chose less instrumental symbol more often than symbol more instrumental for the goal. This result suggests that symbols may differ in a way they are perceived as effective in pursuing the goal.

In Study 1, we focused on exploring the main effect of self-(in)completeness manipulation on choice between less instrumental and more instrumental symbols. However, we did not measure the instrumentality of the symbols as perceived effectiveness of symbols in a goal pursuit. In order to extend result from Study 1, we addressed this issue in Study 2.

Study 2: Self-(in)completeness, Symbol Choice and Instrumentality of Symbols

In Study 2, we made the same predictions regarding the states of incompleteness and completeness as in Study 1, that is, we expected that highly committed runners in the incompleteness condition will be more likely to choose application which is more instrumental for a goal than participants in the completeness condition. In Study 2 we introduced some changes. Firstly, we replaced the manipulation from bogus feedback to recall, which has been previously used to induce feelings of incompleteness (Jordan et al., 2011). Moreover, the sample in Study 2 differs from the sample in Study 1. Participants in Study 1 were recruited through a research platform from a general population, while Study 2 consisted of university students rewarded with credits.

In Study 2, we additionally measured instrumentality of symbols because of the results showing that symbols can take a variety of forms (Gollwitzer et al., 1982; Wicklund & Gollwitzer, 1981). We hypothesized that symbols i.e., massage roller and thermal mug will differ in instrumentality, in a way that massage roller will be perceived as more instrumental for a goal than thermal mug after the decision.

Method

Study design

We performed a 2 × 1 experiment with random allocation to the self-(in)completeness condition (incompleteness condition vs. completeness condition) as a between-subject factor. The dependent variable was a choice of a gift (less instrumental vs. more instrumental).

Participants

The initial sample consisted of 204 volunteers who entered the study platform. The inclusion criteria allowed us to select health-conscious participants engaged in undertaking physical activity. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being active minimum 75 minutes of

vigorous physical activity per week. Those who declared this activity, confirmed being at least 18 years old and gave informed consent were included in the study.

Of the initial 204 participants n = 142 participants met the inclusion criteria and data from this sample were further analyzed. These participants' mean age was M = 28.91 (SD = 8.66), ranging from 19 to 54 years, and 73.20% (n = 104) were female.

Prior to the study, we conducted power analyses using G*Power software (Faul et al., 2007). Frequencies found in Study 1 showed that, given an alpha of $\alpha = .05$ and a power of 80%, a sample of 64 participants would be required to detect an effect size of $\varphi = .35$ for 2 x 1 χ^2 tests.

Additionally, we ran an *a posteriori* sensitivity analysis which indicated that the sample size of N = 142 (given the 80% power) allows for the detection of the effect size of Cohen's d = .24 for the dependent t-test.

Procedure

In Study 2, we repeated the procedure from Study 1 with two modifications. First, participants were recruited via university website for credits. Second, we changed the manipulation. Instead of giving participants randomized feedback with the conclusion on their performance, we used a recall method and asked participants to describe their recent failure or success in achieving a running goal.

Materials and Measures

(In)completeness manipulation. To assign participants for the incompleteness or completeness condition we asked them to consider their last few days in terms of meeting their running goal and write about situation regarding their recent physical activity. In the incompleteness condition, participants were asked to describe a recent situation in which they did something below their standards as runners e.g., exercised for shorter amount of time than should. In the completeness condition, participants were asked to describe a recent situation in

which they did something above their standards as runners e.g., exercised for longer amount of time than should (for details, see Supplementary File D).

Symbol choice. To measure symbol choice, same as in Study 1, we asked participants to choose a gift between less instrumental for a goal (thermal mug) and more instrumental for a goal (massage roller) with a single item '*Which of above would you choose as a gift for participating in the study?*'. In the whole sample, 19.70% of participants (*n* = 28) chose thermal mug and 80.30% of participants (*n* = 114) chose massage roller.

Instrumentality. We measured perceived instrumentality of both symbols with a single item '*Thermal mug/massage roller is an effective tool to achieve a running goal',* similarly as measure used by Zhang et al. (2007) and Kreibich et al. (2021). Participants were asked to indicate how much they agreed or disagreed with this statement, using the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10). The mean response for thermal mug was *M* = 1.69 (*SD* = 2.17) and the mean response for massage roller was *M* = 5.07 (*SD* = 2.92).

Results

Randomization Check

Participants assigned to each group did not differ in a statistical sense in the primary demographic characteristics measured. The groups were homogenous with respect to gender $\chi^2(1, N = 142) = .001$, $p = .979$ and age *K-W*(1,142) = .559, $p = .455$. As the distribution of the commitment to the goal did deviate from normal (for details see Supplementary Materials File H), we decided to perform non-parametric tests (Field, 2013, p. 540). Similarly, there was no difference in the commitment to the goal between incompleteness (*Mdn* = 7.67) and completeness (*Mdn* = 7.67) condition, $U(N_{\text{incompleteness}} = 75, N_{\text{completeness}} = 67) = 2510.50$, z = -.008, $p = .993$, which confirms the effectiveness of random allocation to groups.

Effect of Self-(in)completeness on Symbol Choice

A *chi-square* test of independence was performed to examine the effect of the manipulation on the choice of the symbol. Participants assigned to each condition did differ in a statistical sense in the choice of symbol between less instrumental symbol (thermal mug) and more instrumental symbol (massage roller) $\chi^2(1, N = 142) = 4.09$, $p = .035$ (one-tailed), $\varphi = -.170$ (see Figure 3). As predicted, participants in the incompleteness condition chose more instrumental symbol (massage roller) more often (86.7%) than participants in the completeness condition (73.1%). In line with our prediction, participants in the self-completeness condition chose less instrumental symbol (thermal mug) more often (26.9%) than participants in the self-incompleteness condition (13.3%).

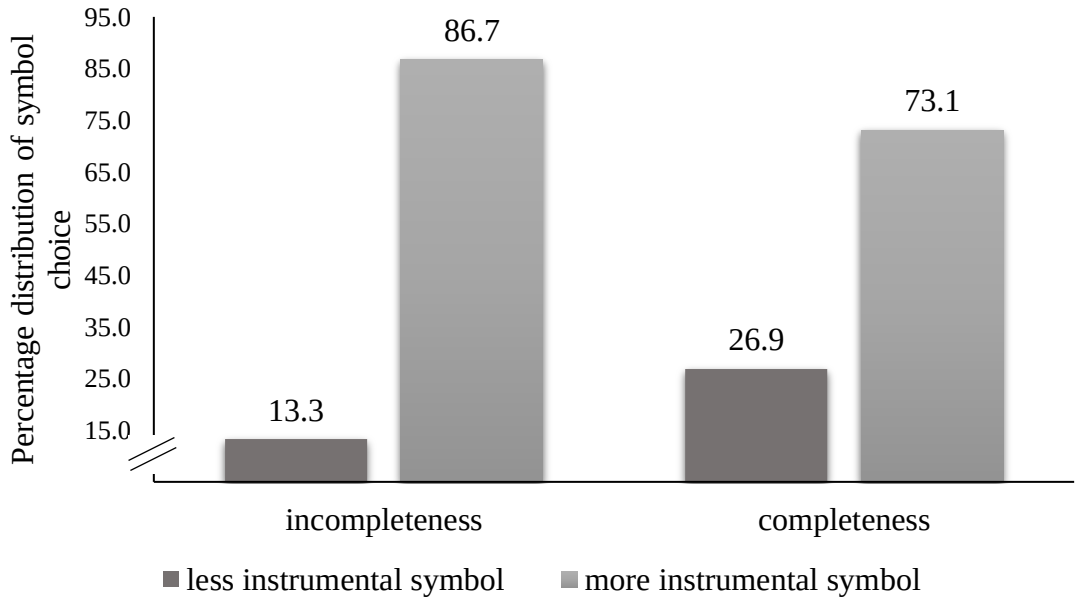

Figure 3. The proportion of choices of the symbols in the two experimental conditions (Study 2).

Instrumentality of Symbols

In order to validate that symbols differed in perceived instrumentality, we carried the dependent *t*-test. On average, massage roller was perceived as significantly more instrumental in terms of effectiveness ($M = 5.07$, $SD = 2.92$) than thermal mug ($M = 1.69$, $SD = 2.17$), $t(136) = -11.28$, $p < .001$, $d = .96$.

Discussion

Study 2 confirmed and extended the results of Study 1. As in Study 1, a self-completeness states affected a subsequent choice of symbol, in a way that experience of incompleteness resulted in more frequent choice of the symbol more instrumental for a goal than the experience of completeness. Noteworthy, these results evinced despite the change of manipulation.

Study 2 demonstrated as well the difference in instrumentality between two symbols. A massage roller was found to be more instrumental than a thermal mug after the decision. This result confirms previous findings showing that means differ in a way their effectiveness for a goal is perceived (Hennecke et al., 2019; Labroo & Kim, 2009; Schumpe et al., 2018). However, the instrumentality translates into choices in the incompleteness condition when the goal is activated.

In Study 2 we did not explore the perceived effort of using a given symbol, which was found to affect perceived effectiveness in attaining a goal before (Labroo & Kim, 2009). We address this issue in Study 3.

Study 3: Self-(in)completeness, Symbol Choice, Instrumentality of Symbols and Effort

In Study 3, we made the same predictions regarding effect of self-(in)completeness manipulation on symbol choice as in Study 1 and Study 2, that is, we expected that highly committed runners in the incompleteness condition will be more likely to choose application which is more instrumental for a goal than participants in the completeness condition. Again, we introduced some changes compared to Study 1 and Study 2. We used new measurement of symbol choice by changing previously proposed products to sport applications. This time, we recruited participants from research platform Prolific.

In Study 3, we made the same predictions regarding instrumentality as in Study 2. We extended measurement of perception of symbols by adding secondary statement focused on

effort. We hypothesized that Application 2 will be perceived as more instrumental for the important goal and will be also perceived as one requiring more effort than Application 1 which is less instrumental for the important goal.

Method

Study design

We performed a 2 × 1 experiment with random allocation to the self-(in)completeness condition (incompleteness condition vs. completeness condition) as a between-subject factor. The dependent variable was a choice of a gift (less instrumental vs. more instrumental).

Participants

The initial sample consisted of 280 volunteers who entered the study platform. The inclusion criteria allowed us to select health-conscious participants engaged in undertaking physical activity. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being active minimum 75 minutes of vigorous physical activity per week. Those who declared this activity, confirmed being at least 18 years old and gave informed consent were included in the study. All procedures of Study 3 and the exclusion criteria were pre-registered at the following link https://aspredicted.org/NL7_C42.

Of the initial 280 participants n = 173 participants met the inclusion criteria and data from this sample were further analyzed. These participants' mean age was M = 36.08 (SD = 11.89), ranging from 18 to 69 years, and 47.40% (n = 82) were female.

Prior to the study, we conducted a power analyses using G*Power software (Faul et al., 2007). Frequencies found in Study 1 and Study 2 showed that, given an alpha of $\alpha = .05$ and a power of 80%, a sample of 66 participants would be required to detect an effect size of $\varphi = .35$ for 2 x 1 χ^2 tests. Results found in Study 2 showed that, given an alpha of $\alpha = .05$ and

a power of 80%, a sample of 11 participants would be required to detect an effect size of Cohen's d = .95 for the dependent t-tests.

Due to the fact that the dependent variable in this study is more complex and the choice might have been affected by different confounds, it seems rationale to have a bit larger sample than calculated. Therefore, we recruited more participants than an indicated sample size.

Procedure

In Study 3, we repeated the procedure from Study 2 with two modifications. First, participants were recruited via research platform Prolific. Second, we changed a type of symbols formed as potential gifts participants could choose from as a reward for participating in the study. Participants could choose between two applications for runners which were selected in Pilot 3. Application 1 represented the less instrumental symbol for the goal and Application 2 represented the more instrumental symbol for the goal.

Materials and Measures

(In)completeness manipulation. To assign participants for the incompleteness or completeness condition, same as in Study 2, we asked them to consider their last few days in terms of meeting their running goal and write about situation regarding their recent physical activity. In the incompleteness condition, participants were asked to describe a recent situation in which they did something below their standards as runners e.g., exercised for shorter amount of time than should. In the completeness condition, participants were asked to describe a recent situation in which they did something above their standards as runners e.g., exercised for longer amount of time than should (for details, see Supplementary File D).

Symbol choice. For the purposes of the Study 3, we created special graphics presenting two applications for runners. Each of the application was accompanied by description of features e.g., following workout statistics, sharing results with friends and

setting personal goals (for details, see Figure 4 for details, see Supplementary File F). To measure symbol choice, we asked participants to choose a gift between less instrumental for a goal (Application 1) and more instrumental for a goal (Application 2) with a single item '*If you could receive a monthly subscription to use on one of the following applications as a gift for participating in the study, which application would you choose?*'. In the whole sample, 31.2% of participants (*n* = 54) chose Application 1 and 68.8% of participants (*n* = 119) chose Application 2.

To select pictures and descriptions of the applications, we performed another pilot study that allowed us to select less instrumental and more instrumental symbols for Study 3. Pilot Study 3 showed that Application 1 and Application 2 differed in instrumentality for an important running goal in a way that Application 2 was perceived as more adjusted to runner's level, more motivating for achieving a running goal, more useful for a runner and as a better tool to achieve the running goal (for details, see Supplementary File E).

Instrumentality. As in Study 2, we measured perceived instrumentality of both symbols with a single item '*Thermal mug/massage roller is an effective tool to achieve a running goal',* similarly as measure used by Zhang et al. (2007) and Kreibich et al. (2021). Participants were asked to indicate how much they agreed or disagreed with this statement, using the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10). The mean response for Application 1 was *M* = 6.76 (*SD* = 1.80) and the mean response for Application 2 was *M* = 7.91 (*SD* = 1.59).

Effort. We measured engagement of effort required to use symbols with a single item statement '*Application 1/Application 2 requires effort to use from a runner',* similarly as measure used by Labroo & Kim (2009). Participants were asked to indicate how much they agreed or disagreed with this statement, using the scale from '*I strongly disagree*' (0) to '*I*

strongly agree' (10). The mean response for Application 1 was $M = 4.74$ ($SD = 2.46$) and the mean response for Application 2 was $M = 7.28$ ($SD = 2.05$).

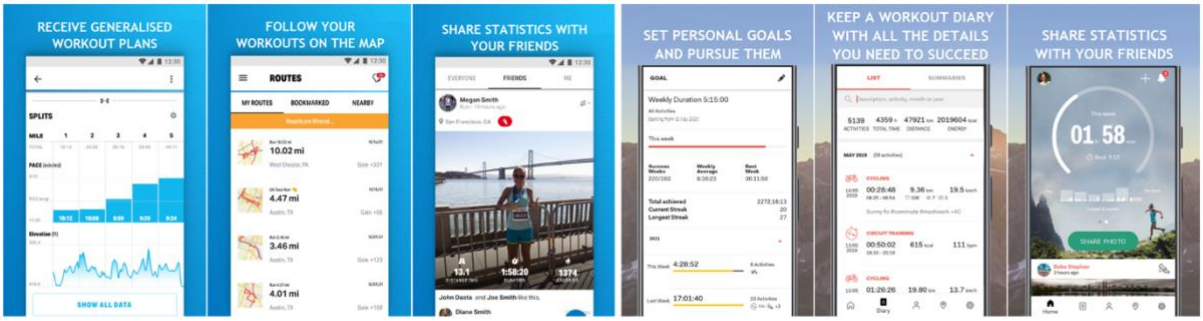

Figure 4. Less and more instrumental symbols used in Study 3 and Study 4.

Results

Randomization check

Participants assigned to each group did not differ in a statistical sense in the primary demographic characteristics measured. The groups were homogenous with respect to gender $\chi^2(1, N = 172) = .449$, $p = .542$ and age $K\text{-}W(1,173) = .021$, $p = .885$. As the distribution of the commitment to the goal did deviate from normal (for details see Supplementary Materials File H), we decided to perform non-parametric tests (Field, 2013, p. 540). Similarly, there was no difference in the commitment to the goal between incompleteness ($Mdn = 8.83$) and completeness ($Mdn = 9.00$) condition, $U(N_{incompleteness} = 94, N_{completeness} = 79) = 3684.00$, $z = -.089$, $p = .929$, which confirms the effectiveness of random allocation to groups.

Effect of Self-(in)completeness on Symbol Choice

A *chi-square* test of independence was performed to examine the effect of the manipulation on the choice of the symbol. Participants assigned to each condition did differ in a statistical sense short of conventional p value in the symbol choice between less instrumental symbol (Application 1) and more instrumental symbol (Application 2) $\chi^2(1, N = 173) = 3.10$, $p = .055$ (one-tailed), $\varphi = .134$ (see Figure 5). As predicted, participants in the

self-incompleteness condition chose more instrumental symbol (Application 2) more often (74.5%) than participants in the self-completeness condition (62.0%). In line with our prediction, participants in the self-completeness condition chose less instrumental symbol (Application 1) more often (38.0%) than participants in the self-incompleteness condition (25.5%).

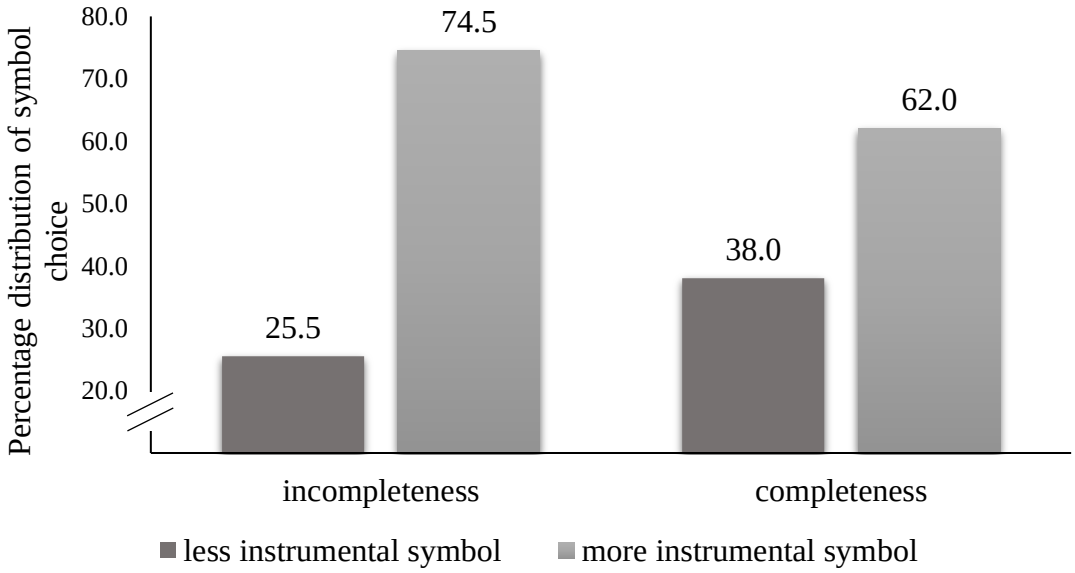

Figure 5. The proportion of choices of the symbols in the two experimental conditions (Study 3).

Instrumentality of Symbols

In order to validate that symbols differed in perceived instrumentality, we carried the dependent *t*-test. On average, Application 2 was perceived as significantly more instrumental in terms of effectiveness (M = 7.91, SD = 1.59) than Application 1 (M = 6.76, SD = 1.80), $t(172) = 6.61$, $p < .001$, $d = .50$.

Effort

In order to validate that the symbols differed in perceived engagement of effort, we carried the dependent *t*-test. On average, Application 2 was perceived as one requiring significantly more effort to use (M = 7.28, SD = 2.05) than Application 1 (M = 4.74, SD = 2.46), $t(172) = 10.71$, $p < .001$, $d = .82$.

Discussion

Study 3 confirmed and extended the results of Study 1 and Study 2. We found the same effect of self-completeness states on choice of symbol. The experience of incompleteness led up to more frequent choice of the symbol more instrumental for a goal than the experience of completeness. Note that these results evinced short of conventional *p* value despite the change of symbols, compared to Study 1 and Study 2.

Study 3 vindicated the difference in instrumentality between two used symbols. The instrumentality of symbol more instrumental for a goal (Application 2) was found to be higher than instrumentality of symbol less instrumental for a goal (Application 1) in terms of effectiveness. Finally, symbol more instrumental for the important goal (Application 2) was perceived as one requiring more effort than symbol less instrumental for the important goal (Application 1).

Study 4: Self-(in)completeness, Symbol Choice, Instrumentality of Symbols, Effort and Social Reality

In Study 4, we made the same predictions regarding effect of self-(in)completeness manipulation on symbol choice as in Studies 1, 2 and 3, that is, we expected that highly committed runners in the incompleteness condition will be more likely to choose more instrumental application than participants in the completeness condition. We also made the same predictions regarding instrumentality and effort as in Study 2 and Study 3, that is, we hypothesized that Application 2 will be perceived as more instrumental for the important goal and will be also perceived as one requiring more effort than Application 1 which is less instrumental for the important goal.

In Study 4, we introduced the manipulation of social reality. Based on the theory and findings showing social reality fosters the sense of completeness (Gollwitzer et al., 2009; Wicklund & Gollwitzer, 1982), we hypothesize that effect of self-(in)completeness

manipulation on symbol choice will be qualified by social reality in such a way that in the social reality condition the difference in the likelihood of choosing more instrumental option in the incompleteness condition compared to completeness condition will be larger than in the no social reality condition.

Method

Study design

We performed a 2 × 2 experiment with random allocation to the self-(in)completeness condition (incompleteness condition vs. completeness condition) and social reality condition (social reality vs. no social reality) as a between-subject factors. The dependent variable was a choice of a gift (less instrumental vs. more instrumental).

Participants

The initial sample consisted of 300 volunteers who entered the study platform. The inclusion criteria allowed us to select health-conscious participants engaged in undertaking physical activity. Taking recommendations by the World Health Organization (2011) as a reference point, participants had to meet the criteria of being active minimum 75 minutes of vigorous physical activity per week. Those who declared this activity, confirmed being at least 18 years old and gave informed consent were included in the study. Participants in Study 4 were recruited through a research platform Prolific, similarly as in Study 3. All procedures of Study 4 and the exclusion criteria were pre-registered at the following link https://aspredicted.org/CVK_1LD.

Of the initial 300 participants n = 200 participants met the inclusion criteria and data from this sample were further analyzed. These participants' mean age was M = 37.15 (SD = 11.60), ranging from 18 to 68 years, and 48.50% (n = 97) were female.

Prior to the study, we conducted a power analysis using the rule of thumb called events per variable (EPV). EPV is calculated by dividing the number of participants in the

smaller of two outcome groups by the number of regression coefficients estimated. We expect three coefficients (predictors) in the binomial regression (incompleteness manipulation, social reality and the product of the two) so in order to have EPV > 20, we need to acquire at least 60 participants in the smaller of two outcome groups. Based on the previous study the proportion of choosing Application 1 versus 2 is 68.8 : 31.2. This indicates that for three predictors, we need a sample size of at least 192 participants. Prior to the study, we conducted a power analyses using G*Power software (Faul et al., 2007). Results found in Study 2 and Study 3 showed that, a sample of 16 participants would be required to detect an effect size of Cohen's d = .78 for the dependent t-test measuring instrumentality. Results found in Study 3 showed that, a sample of 14 participants would be required to detect an effect size of Cohen's d = .81 for the dependent t-test measuring effort.

Procedure

In Study 4, we repeated the procedure from Study 3 with two modifications. We introduced two more conditions by adding social reality manipulation. Moreover, we asked additional questions about both applications after participants made their choice.

Materials and Measures

(In)completeness manipulation. To assign participants for the incompleteness or completeness condition, same as in Study 2 and Study 3, we asked them to consider their last few days in terms of meeting their running goal and write about situation regarding their recent physical activity. In the incompleteness condition, participants were asked to describe a recent situation in which they did something below their standards as runners e.g., exercised for shorter amount of time than should. In the completeness condition, participants were asked to describe a recent situation in which they did something above their standards as runners e.g., exercised for longer amount of time than should (for details, see Supplementary File D).

Symbol choice. We used the same symbols as in Study 3 i.e., applications for runners. To measure symbol choice, we asked participants to choose a gift between less instrumental for a goal (Application 1) and more instrumental for a goal (Application 2) with a single item '*If you could receive a monthly subscription to use on one of the following applications as a gift for participating in the study, which application would you choose?*'. In the whole sample, 31.0% of participants (n = 64) chose Application 1 and 68.0% of participants (n = 136) chose Application 2.

Instrumentality. As in Study 2 and Study 3, we measured perceived instrumentality of both symbols with a single item '*Application 1/Application 2 is an effective tool to achieve a running goal'*, similarly as measure used by Zhang et al. (2007) and Kreibich et al. (2021). Participants were asked to indicate how much they agreed or disagreed with this statement, using the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10). The mean response for Application 1 was M = 6.89 (SD = 1.93) and the mean response for Application 2 was M = 7.71 (SD = 1.71).

Additionally, we measured instrumentality as an index composed of three items: '*Application 1/Application 2 helps to achieve a running goal'*, *'Application 1/Application 2 is useful for a runner', and* '*Application 1/Application 2 is an effective tool to achieve a running goal'*. Participants were asked to indicate how much they agreed or disagreed with this statement, using the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10).

The mean response regarding usefulness for Application 1 was M = 6.91 (SD = 1.88) and for Application 2 was M = 7.80 (SD = 1.66). The mean response regarding helpfulness for Application 1 was M = 7.35 (SD = 1.72) and for Application 2 it was M = 7.90 (SD = 1.65). The value for Cronbach's Alpha for Application 1 is α =.92 and value for Cronbach's Alpha is α =.90 for Application 2.

Effort. As in Study 3, we measured engagement of effort required to use symbols with a single item statement '*Application 1/Application 2 requires effort to use from a runner'*, similarly as measure used by Labroo & Kim (2009). Participants were asked to indicate how much they agreed or disagreed with this statement, using the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10). The mean response for Application 1 was $M = 4.75$ ($SD = 2.41$) and the mean response for Application 2 was $M = 6.91$ ($SD = 2.16$).

Results

Randomization check

Participants assigned to each group did not differ in a statistical sense in the primary demographic characteristics measured. The groups were homogenous with respect to gender $\chi^2(6, N = 200) = 6.54$, $p = .366$ and age $K\text{-}W(3,200) = 3.73$, $p = .293$, which confirms the effectiveness of random allocation to groups. As the distribution of the commitment to the goal deviated from normal (for details see Supplementary Materials File H), we decided to perform non-parametric tests (Field, 2013, p. 540). Four experimental groups differed in a statistical sense short of conventional *p* value in commitment to the goal. A Kruskal-Wallis test showed a marginally insignificant difference in the level of commitment between conditions, $\chi^2(3) = 7.72$, $p = .052$, $E^2_R = .039$. Post hoc Mann-Whitney tests with Bonferroni correction showed no differences between conditions to be significant.

Effect of Self-(in)completeness and Social Reality on Symbol Choice

In order to test self-(in)completeness and social reality manipulation effect on choice of the symbol, we ran the logistic regression analysis with symbol choice as the dependent variable, self-(in)completeness manipulation and social reality manipulation as two independent variables and interaction of two as predictors. The (in)completeness manipulation was found to have a significant effect on symbol choice, $B = -0.98$, $SE = 0.48$, $p < .05$. The social reality manipulation was not a significant predictor of the symbol choice $B =$

-0.12, *SE* = 0.44, *p* = .79. The interaction of two predictors was not significant, β = -0.29, *SE* = 0.65, *p* = .66.

Instrumentality of Symbols

In order to verify that symbols differed in instrumentality, we carried the dependent *t*-tests. First, Application 2 was perceived as significantly more instrumental in terms of effectiveness (*M* = 7.71, *SD* = 1.71) than Application 1 (*M* = 6.89, *SD* = 1.93), *t*(199) = 5.51, *p* < .001, *d* = .39. Second, Application 2 was perceived as significantly more instrumental measured as an index (*M* = 7.80, *SD* = 1.52) than Application 1 (*M* = 7.05, *SD* = 1.71), *t*(199) = 6.04, *p* < .001, *d* = .43.

Effort

In order to verify that symbols differed in engagement of effort, we carried the dependent *t*-test. On average, Application 2 was perceived as one requiring significantly more effort to use (*M* = 6.91, *SD* = 2.16) than Application 1 (*M* = 4.75, *SD* = 2.41), *t*(199) = 9.92, *p* < .001, *d* = .70.

Meta-analysis

In order to summarize the effect of (in)completeness manipulation on choice of the symbol, I conducted a meta-analysis for Studies 1 – 4. Overall, the results showed that the pooled effect size was *OR* = 2.07, 95% CI [1.46, 2.94]), *p* < .001 (see Figure 6). Participants in the incompleteness condition were choosing instrumental symbol more often than participants in the completeness condition in Studies 1 – 4.

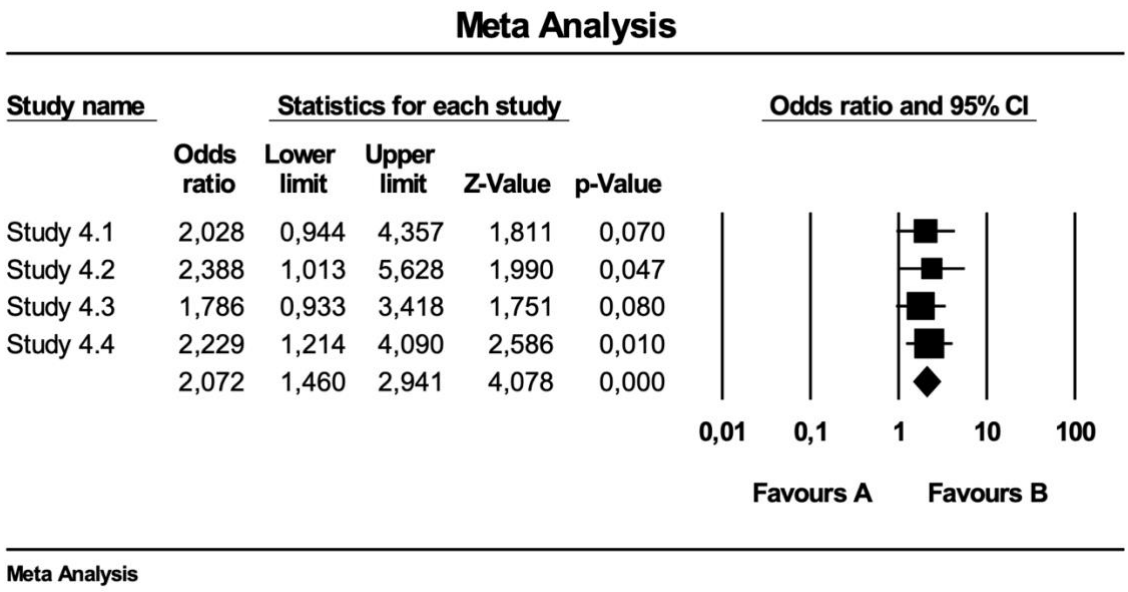

Figure 6. A meta-analysis for Studies 1 – 4 summarizing the effect of (in)completeness manipulation on choice of the symbol.

Discussion

In Study 4, we found consistently the effect of self-(in)completeness states on the choice of more instrumental symbols. The experience of incompleteness led up to a more frequent choice of the symbol more instrumental for a goal than the experience of completeness. Contrary to what we expected, social real did not qualify the effect. One of the explanations is that participants in the no social reality did not consider their situation as fully private. We additionally tested whether the social reality affected the number of words and signs used to write impressions on the chosen application. We found no significant difference between the social reality (M = 19.42, SD = 12.19) and no social reality condition (M = 18.31, SD = 12.74), $F(1, 198) = .39$, p =.531 in number of words. Similarly, there was no significant difference between the social reality (M = 83.67, SD = 51.61) and no social reality condition (M = 79.06, SD = 55.16), $F(1, 198) = .37$, p =.544 in number of signs. It is likely that individuals taking part in online studies do not consider any of their answers as private as they all may be read by researchers.

Study 4 tested the difference in the instrumentality between two symbols. Effectiveness of a symbol more instrumental for a goal (Application 2) was found to be higher than of a symbol less instrumental for a goal (Application 1). The symbol more instrumental for a goal (Application 2) was found to be more instrumental than the symbol less instrumental for a goal (Application 1) when measured as an index of three items including statements such as helpful, useful and effective in achieving the important goal. Finally, a symbol more instrumental for the important goal (Application 2) was perceived as one requiring more effort than a symbol less instrumental for the important goal (Application 1).

General Discussion

The objective of the present research was to examine the preference for instrumental symbols in the incompleteness states among individuals with the identity goal of being a committed runner. Four reported studies confirmed that the experience of incompleteness directs choices towards symbols more instrumental for an aspired-to identity goal more frequently than the experience of completeness. Studies grounded in the self-completion theory showed that experience of incompleteness results in engaging in self-symbolizing behaviors more often than experience of completeness (Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Sorys et al., in press; Wicklund & Gollwitzer, 1981). Enriching these findings, our studies examined a preference for instrumental self-symbols in the incompleteness states in situations of choice between two available symbols.

Contrary to our hypothesis, social reality did not enhance the effect of manipulation. We speculate that social reality manipulation is difficult to be successful in an online setting. Previous studies showing the effect of social reality condition on self-symbolization were conducted in real-life conditions (Gollwitzer, 1986; Gollwitzer et al., 2009). So far, there is no evidence that this procedure can be translated into online settings. It is also possible that

participants in the neutral condition found it difficult to believe that their answers would not be read by others, which makes the no social reality condition hard to achieve. Nowadays, almost everything that individuals do online is registered and tracked, an example of which is personalized advertising on social networking sites. Future research could show how decrease in privacy, especially in younger generations, affects social reality and to be more precise about private and public self-symbolizing.

Beyond exploration of preferences between more instrumental and less instrumental symbols in self-incompleteness states, we examined perceived instrumentality of symbols. To date, work grounded in goal-systems theory has shown that means which require effort (Labroo & Kim, 2009) are perceived as more instrumental. Study 2 confirmed that individuals perceive differences in instrumentality of symbols when evaluating their effectiveness for aspired-to identity goal. In Study 3 we found that engagement of effort required for using symbols is concurrent with instrumentality. In line with previous findings, symbols requiring more effort were found to be seen as more instrumental for an important goal at the same time (Labroo & Kim, 2009).

Table 1. *Summary of manipulations and dependent variables used in Studies 1 – 4.*

	Study 1	Study 2	Study 3	Study 4
Manipulation	Bogus feedback	Recall	Recall	Recall
Dependent variable	Thermal mug vs. massage roller	Thermal mug vs. massage roller	Applications for runners	Applications for runners

When generalizing our findings, it is worth noting some limitations. First, choices between symbols were made in an online setting instead of real-life conditions measured by observations, which certainly would be even more valuable than mere declarations made by

the participants. Nevertheless, the choices made in hypothetical situations were sufficient to notice preferences between more and less instrumental symbols in self-incompleteness states. Second, we examined two conditions i.e., incompleteness and completeness and did not include control condition. We focused on two states distinguished in self-completion theory but in the future it is warrant to explore control group as comparison. Finally, our samples were composed only of committed runners. In our series of studies, we chose one identity goal and tested preferences for symbols by introducing different manipulations and dependent variables. We can see a great potential in further exploration of instrumentality of symbols among diverse samples with different goals such as being a good parent or being eco-friendly, as aspired-to self-definition can take variety of forms (Gollwitzer et al., 1982; Wicklund & Gollwitzer, 1981).

Future research could also examine more factors related to instrumentality of symbols than effort. Prior work suggests than pain can be related to increased instrumentality (Schumpe et al., 2018). Kruglanski et al. (2002) states that instrumentality (subjective utility to be precise) is associated with many factors beyond effort, such as circumstances, expectancy of attainment or commitment. For example, when impressing the audience is important, individual may opt for means that acquire such an effect. Studies grounded in self-completion theory, capturing different instrumentality-related phenomenon could greatly contribute to the existing results. Recent work has shown that building up commitment by personal choice leads to action shielding (Falk et al., 2022; Gendolla et al., 2021). Highly committed individuals were found to self-symbolize more after experience of incompleteness than weakly committed ones (Gollwitzer et al., 2013). The role of goal commitment should be further examined in context of choice making. Instrumentality of symbols should also be considered in context of compensatory self-symbolizing. It seems important to explore whether perceived instrumentality of symbols influence the effect of self-incompleteness

enhancing engagement in self-symbolizing behaviors (Longoni et al., 2014; Marquardt et al., 2016; Sciara et al., 2022; Sorys et al., in press; Wicklund & Gollwitzer, 1981) and self-completeness results in lesser engagement in self-symbolization (Doerflinger et al., 2021; Wicklund & Gollwitzer, 1981). It would be also worth exploring in future research whether perceived instrumentality is stable over time or can it change due to external factors e.g., weather or internal factors e.g., mood. Lastly, we find it interesting to test effects of manipulation of instrumentality. We would like to see if description manipulation of the same product may change the preferences of symbols choice both in committed and non-committed samples.

To summarize, our research extends the literature on symbolic self-completion, focusing on instrumentality of symbols for important aspired-to identity goals. We showed that incompleteness increases the preference to choose more instrumental symbols for important goal. These results suggests that state of incompleteness directs individuals towards the biggest possible efficacy in goal pursuit. Finally, instrumental symbols are seen as more effective for an important goal and are connected engagement of effort.

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Supplementary materials

Supplementary materials include additional information and more detailed analyses that are referred to in the main text of the manuscript The states of self-incompleteness direct individuals' preference towards more instrumental symbols.

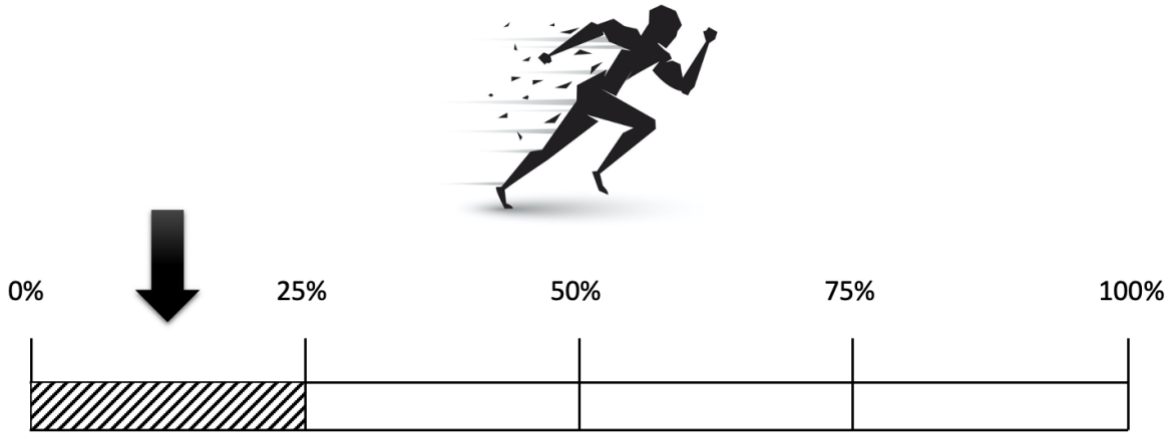
Klaudia Sorys, Peter M. Gollwitzer, & Katarzyna Byrka

Table of contents

Supplementary File A

(In)completeness manipulation used in Study 1

Incompleteness condition

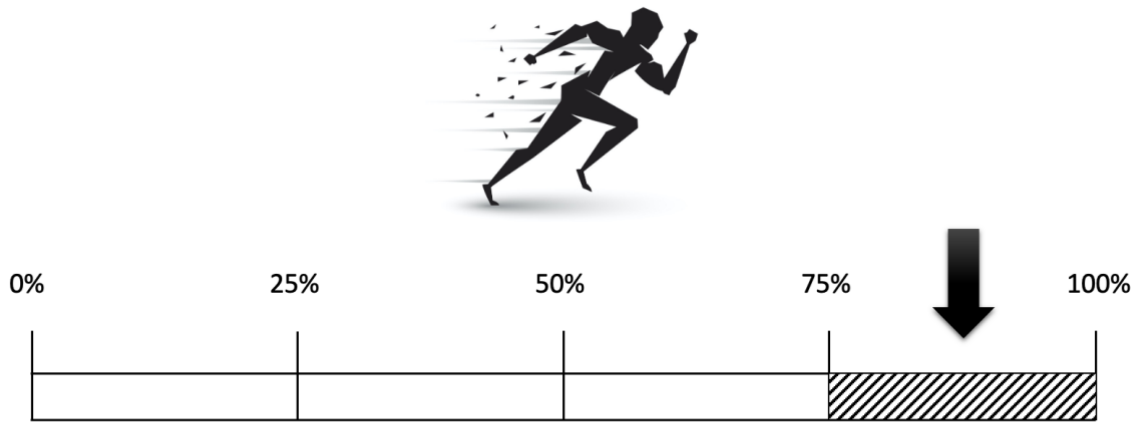


Your score, compared to others "$q{//:QID97/ChoiceGroup/SelectedChoices}"

participants commitment "$q{//:QID99/ChoiceGroup/SelectedChoices}"

As a result of comparing your responses with the responses of other participants, who are just as committed to the running goal as you are, we receive the information that your result places you in 1st quarter, i.e., it is **worse than the result of 75%** of the survey participants.

Completeness condition



Your score, compared to others "$q{//:QID97/ChoiceGroup/SelectedChoices}"

participants commitment "$q{//:QID99/ChoiceGroup/SelectedChoices}"

As a result of comparing your responses with the responses of other participants, who are just as committed to the running goal as you are, we receive the information that your result places you in 4th quarter, i.e., it is **better than the result of 75%** of the survey participants.

Supplementary File B

Pilot study 1

The aim of the first pilot study was to find the most suitable symbols in form of the gifts for runners. The two gifts were selected in a pilot study conducted with 100 participants. These participants' mean age was *M* = 26.29 (*SD* = 8.70), ranging from 19 to 57 years, and 89.00% (*n* = 89) were female. Participants evaluated 8 different gifts adjusted for runners.

We asked participants to indicate on the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10), how much they agree with presented statements: (1) This product helps to be a better runner, (2) This product is an effective tool to achieve the goal related to jogging, (3) This product is useful for a runner, (4) This product can motivate a runner to follow his/her goal, (5) This product is attractive for a runner and answer one question (6) How much money would you be willing to spend on this product?

Results showed two products, such as thermal cup and massage roller, which differed in a way that indicates non-instrumental and instrumental symbol for an important goal. Massage roller was rated as significantly better product to help become a better runner (*M* = 5.79, *SD* = 3.00, 95%CI [5.20, .6.38]) than thermal cup (*M* = 1.58, *SD* = 2.07, 95%CI [1.17, 2.00]), as significantly better tool to achieve the goal related to jogging (*M* = 5.78, *SD* = 2.80, 95%CI [5.22, 6.34]) than thermal cup (*M* = 1.46, *SD* = 2.06, 95%CI [1.05, 1.88]), as significantly more useful for a runner (*M* = 7.40, *SD* = 2.51, 95%CI [6.90, 7.90]) than thermal cup (*M* = 2.82, *SD* = 2.76, 95%CI [2.27, 3.37]), as significantly more motivating for a runner (*M* = 3.85, *SD* = 2.60, 95%CI [3.33, 4.37]) than thermal cup (*M* = 2.70, *SD* = 2.52, 95%CI [2.20, 3.20]), as significantly more attractive (*M* = 6.82, *SD* = 2.57, 95%CI [6.31, 7.33]) than thermal cup (*M* = 3.92, *SD* = 2.83, 95%CI [3.36, 4.48]) and as significantly more expensive (*M* = 104.43, *SD* = 68.39, 95%CI [90.86, 118.00]) than thermal cup (*M* = 36.83, *SD* = 60.03,

95%CI [24.92, 48.74]). Values for monetary worth are presented in Polish zlotys (1 PLN = 0.23 USD).

Pilot study 2

The aim of the second pilot study was confirm the results of Pilot 1 and extend them by exploring the proportion of the choice between the two gifts. In the second pilot study we included only two gifts selected in the first pilot study. After deciding on concrete brands and designs of both gifts we launched second pilot study to confirm previous results. Additionally, we explored how the proportion of the choice between the two gifts looks like.

The group of 147 participants took part in this study. These participants' mean age was *M* = 39.75 (*SD* = 14.00), ranging from 18 to 79 years, and 59.90% (*n* = 88) were female. Participants were presented with two gifts for runners and asked to choose which one of those would they take home if they could. The order of products was randomized. Next, participants answered the questions regarding both of the products, same as in Pilot 1, using the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10).

In the whole sample, 50.30% of participants (*n* = 74) chose thermal cup and 49.70% of participants (*n* = 73) chose massage roller. Massage roller was rated as significantly better product to help become a better runner (*M* = 6.52, *SD* = 2.86, 95%CI [6.06, .6.99]) than thermal cup (*M* = 4.78, *SD* = 3.34, 95%CI [4.24, 5.33]), as significantly better tool to achieve the goal related to jogging (*M* = 6.50, *SD* = 2.85, 95%CI [6.03, 6.96]) than thermal cup (*M* = 4.97, *SD* = 3.24, 95%CI [4.45, 5.50]), as significantly more useful for a runner (*M* = 7.01, *SD* = 2.84, 95%CI [6.55, 7.48]) than thermal cup (*M* = 6.18, *SD* = 3.17, 95%CI [5.67, 6.70]), as significantly more motivating for a runner (*M* = 6.18, *SD* = 2.84, 95%CI [5.72, 6.65]) than thermal cup (*M* = 5.39, *SD* = 3.30, 95%CI [4.86, 5.93]), as significantly more attractive (*M* = 6.64, *SD* = 2.75, 95%CI [6.19, 7.09]) than thermal cup (*M* = 6.05, *SD* = 3.15, 95%CI [5.54, 6.57]) and as significantly more expensive (*M* = 140.20, *SD* = 127.48, 95%CI [119.42,

160.98]) than thermal cup (*M* = 89.01, *SD* = 112.09, 95%CI [70.74, 107.28]). Values for monetary worth are presented in Polish zlotys (1 PLN = 0.23 USD).

The results of Pilot 1 and Pilot 2 allowed us to select non-instrumental and instrumental symbols for Study 1 and Study 2.

Supplementary File C

Non-instrumental and instrumental symbols for Study 1 and Study 2

Non-instrumental symbol - Thermal cup

Instrumental symbol - Massage roller

Supplementary File D

(In)completeness manipulation used in Study 2, Study 3 and Study 4

Incompleteness condition

Consider your last few days in terms of meeting your running goal. Write about a situation where you did something below your standards regarding runner's physical activity.

Here are some examples:

You didn't train as intensively as you wanted.

You exercised for shorter amount of time than you should.

You broke your training plans by taking an unexpected day off.

These are just examples. Describe your experiences from recent days regarding physical activity which did not live up to your standards as a runner. These should be situations similar to the examples above.

Incompleteness condition

Consider your last few days in terms of meeting your running goal. Write about a situation where you did something above your standards regarding runner's physical activity.

Here are some examples:

You trained more intensively than you wanted.

You exercised for longer amount of time than you should.

You expanded your training plans by doing additional training.

These are just examples. Describe your experiences from recent days regarding physical activity which exceeded your standards as a runner. These should be situations similar to the examples above.

Supplementary File E

Pilot Study 3

The aim of the third pilot study was to select alternative symbols in form of the gifts for runners. In Study 3 we wanted to expand and replicate results from Study 2 by using different set of symbols. We prepared two prototypes of applications for runners in form of advertisement pictures and descriptions of their main features. We launched pilot study to explore runners' opinions about those applications, the proportion of the choice between them and mainly noticeable features.

The group of 56 participants took part in this study. These participants' mean age was M = 35.21 (SD = 11.00), ranging from 19 to 61 years, and 37.50% (n = 21) were female. Participants were presented with two applications for runners as potential reward for participating in the study and asked to choose one which they would like to receive a monthly subscription on. The order of applications was randomized. After the choice participants were asked an open question regarding the main cause of their choice. Next, we asked participants their opinion about both of the applications in set of following questions. We asked participants to indicate on the scale from '*I strongly disagree*' (0) to '*I strongly agree*' (10), how much they agree with the statements: (1) This application helps to achieve a running goal, (2) This application helps to be a better runner, (3) This application is attractive for a runner, (4) This application meets the runner's needs, (5) This application is adjusted to the runner's level, (6) This application is universal for runners, (7) This application requires effort from a runner, (8) This application motivates a runner to achieve the running goal, (9) This application is useful for a runner, (10) This application is an effective tool to achieve a running goal. We also asked participants about their favorite feature and biggest limitation of both applications by presenting the list of 6 features e.g., ability to set personal goals, automatically generated standardized workout or ability to share results with friends. In the

end we asked participants which of presented applications would allow them more to become a better runner.

In the whole sample, 26.80% of participants (n = 15) chose Application 1 and 73.20% of participants (n = 41) chose Applications 2. Results showed that Application 1 and Application 2 differed in a way which indicates non-instrumental and instrumental symbol for an important running goal. The main reasons for choosing Application 1 mentioned by participants were ease of use, less effort required to use and no necessity of planning the workouts. The main reasons for choosing Application 2 mentioned by participants were personalized goals, more control over the workouts and ability to plan a routine.

Application 2 was rated as significantly more adjusted to runner's level (M = 7.63, SD = 1.94, 95%CI [7.11, 8.14]) than Application 1 (M = 5.88, SD = 2.57, 95%CI [5.19, 6.56]), as significantly more motivating for achieving a running goal (M = 7.79, SD = 1.65, 95%CI [7.34, 8.23]) than Application 1 (M = 6.79, SD = 1.67, 95%CI [6.34, 7.23]), as significantly more useful for a runner (M = 8.25, SD = 1.60, 95%CI [7.82, 8.68]) than Application 1 (M = 7.30, SD = 1.79, 95%CI [6.82, 7.78]) and as significantly better tool to achieve the running goal (M = 7.98, SD = 1.43, 95%CI [7.60, 8.37]) than Application 1 (M = 6.73, SD = 2.03, 95%CI [6.19, 7.28]). The differences in remaining statements were not significant but Application 2 was perceived as more helpful for achieving the running goal, as the one which meets the runner's needs more and as the one which requires more effort from the user than Application 1.

The most often indicated favorite features of Application 1 were the fact that application doesn't require a lot of effort from the user (33 indications) and ability to follow workout statistics (20 indications). The most often indicated favorite features of Application 2 were ability to set personal goals (38 indications) and the fact that application is personalized and adjusted to runners' needs (31 indications). The most often indicated biggest limitation of

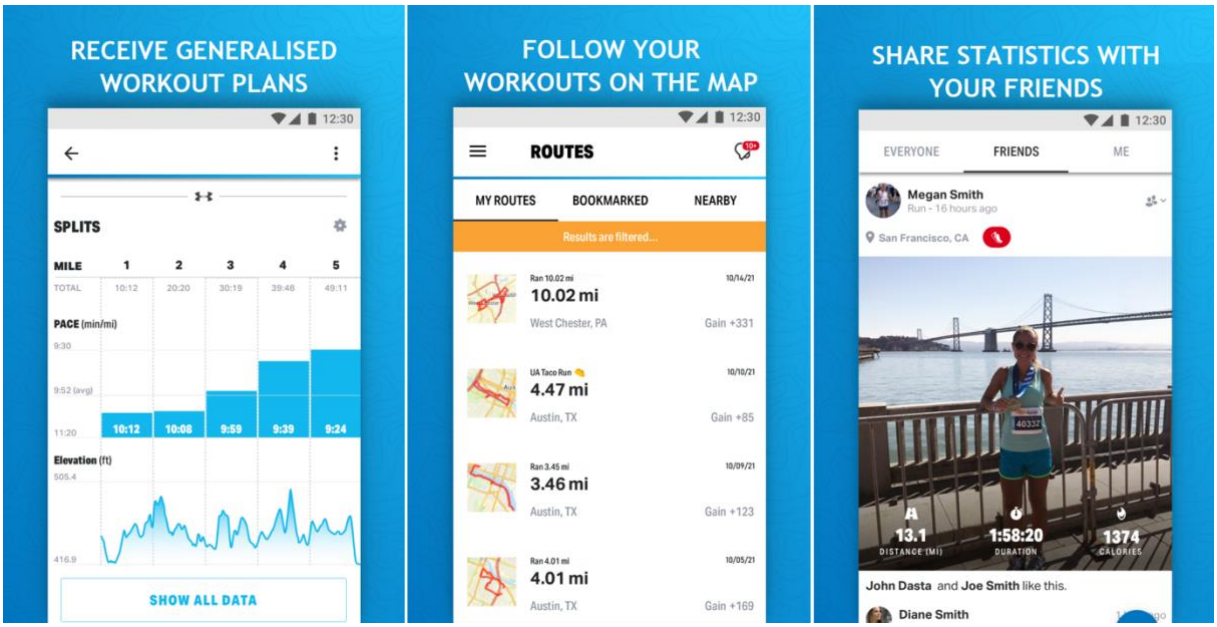
Application 1 was the fact that application offers automatically generated standardized workouts (26 indications) while the most often indicated biggest limitation of Application 2 was the fact that application requires effort from the user (27 indications). In the whole sample, 83.90% of participants (n = 47) chose Applications 2 and 16.10% of participants chose Application 1 (n = 9) as the one which allows them more to become a better runner.

The results of Pilot 3 allowed us to select non-instrumental and instrumental symbols for Study 3.

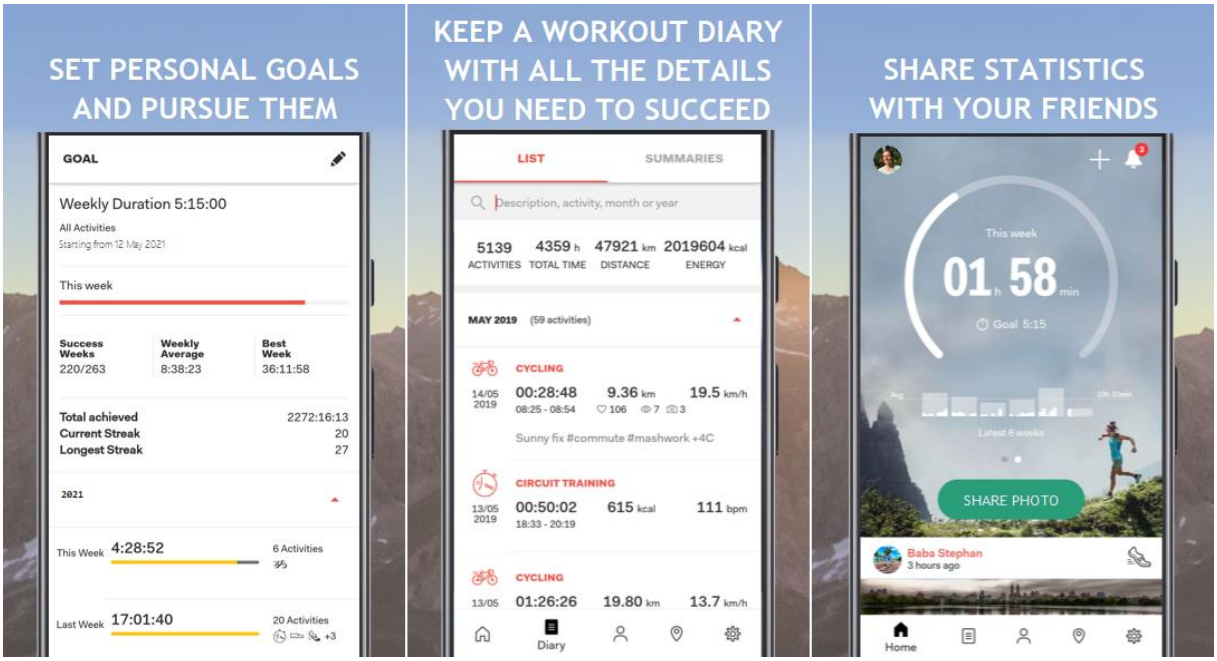
Supplementary File F

Non-instrumental and instrumental symbols for Study 3 and Study 4

Non-instrumental symbol – Application 1



Instrumental symbol – Application 2



Attached list of applications features

FEATURES	APPLICATION 1	APPLICATION 2
WORKS ON ANDROID AND iOS	✓	✓
SUITABLE FOR RUNNING, CYCLING AND GYM SPORTS	✓	✓
SHARE RESULTS WITH FRIENDS	✓	✓
FOLLOW WORKOUT STATISTICS	✓	✓
DO NOT WEAR A WATCH	✓	✓
SET PERSONALISED GOALS		✓
LITTLE EFFORT TO USE	✓	

Supplementary File G

Means and standard deviations for all symbols' measures in Study 3

Table 1. *Differences in means and standard deviations for all symbols' measures in Study* 3

Measurement	Application 1 *M* (*SD*)	Application 2 *M* (*SD*)	*p*
Application helps to achieve a running goal	6.84 (1.77)	7.88 (1.55)	< .001
Application helps to become a better runner	6.72 (1.62)	7.19 (1.77)	.002
Application is attractive	7.45 (1.87)	7.14 (1.85)	.049
Application meets the runner's needs	6.79 (1.92)	7.93 (1.34)	< .001
Application is adjusted to the runner's level	5.78 (2.46)	7.64 (1.78)	< .001
Application is universal for runners	7.22 (1.85)	6.82 (2.13)	.016
Application motivates a runner to achieve a running goal	6.66 (2.02)	7.62 (1.53)	< .001
Application 1 is useful for a runner	7.45 (1.54)	8.20 (1.42)	< .001

Note. M: Mean; *SD*: Standard Deviation; *p*: p-value.

Supplementary File H

Tests for normality of commitment to the goal

Study 1

The skewness of the commitment to the goal was found to be β = -.94, indicating that the distribution of the responses was left-skewed. The kurtosis of the commitment to the goal was found to be κ = .67, indicating that the distribution is slightly more light-tailed compared to the normal distribution. We carried out the test of normality of distribution for the commitment to the goal, which showed that this variable significantly deviated from the normal distribution: $D(110) = .12$, $p < 001$.

Study 2

The skewness of the commitment to the goal was found to be β = -1.04, indicating that the distribution of the responses was left-skewed. The kurtosis of the commitment to the goal was found to be κ = 1.90, indicating that the distribution is more light-tailed compared to the normal distribution. We carried out the test of normality of distribution for the commitment to the goal, which showed that this variable significantly deviated from the normal distribution: $D(142) = .14$, $p < 001$.

Study 3

The skewness of the commitment to the goal was found to be β = -.79, indicating that the distribution of the responses was left-skewed. The kurtosis of the commitment to the goal was found to be κ = .39, indicating that the distribution is slightly more light-tailed compared to the normal distribution. We carried out the test of normality of distribution for the commitment to the goal, which showed that this variable significantly deviated from the normal distribution: $D(173) = .13$, $p < 001$.

Study 4

The skewness of the commitment to the goal was found to be $\beta = -1.04$, indicating that the distribution of the responses was left-skewed. The kurtosis of the commitment to the goal was found to be $\kappa = 1.45$, indicating that the distribution is more light-tailed compared to the normal distribution. We carried out the test of normality of distribution for the commitment to the goal, which showed that this variable significantly deviated from the normal distribution: $D(200) = .13$, $p < 001$.