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Floor M. Kroese & Denise T. D. de Ridder

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## Health behaviour procrastination: a novel reasoned route towards self-regulatory failure

Floor M. Kroese and Denise T. D. de Ridder

Department of Psychology, Utrecht University, Utrecht, The Netherlands

### ABSTRACT

In this paper, we highlight a novel perspective on health behaviour failure by considering reasoned procrastination as a contributing factor. We argue that the failure to enact intentions does not necessarily occur because people are victims of their strong impulses, but that people may also knowingly and wilfully postpone their intended actions. While procrastination is acknowledged as a factor associated with intention-behaviour gaps in other domains, it has surprisingly received only very little attention in the domain of health behaviour. We argue that it is particularly important to recognise the waxing and waning of intentions: rather than being truly abandoned, intentions may sometimes be temporarily put aside. This paper describes how the procrastination account relates to the intention-behaviour gap as we know it, what is known about procrastination and health behaviour, and what theoretical and practical implications can be derived from the addition of this novel perspective to our understanding of health behaviour change.

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Tim is vastly determined to go to the gym this week. He considers going on Monday, but the week is still long; so Wednesday also seems a fine day to go exercising. Wednesday, he does not really feel like going, and as there is still time left this week, he decides to go on Saturday. Saturday, however, a friend comes over and Tim's exercise plans are moved to Sunday – unfortunately, though, Sunday is his lazy day, so in the end Tim does not go at all. Similar things happen to Mary, who knows she should make a dentist appointment soon – the point is, she has known it for months but just has not got to it yet; and to Julia, who has been postponing her plan to start with a diet because every time she considered it the time did not seem right because of a nice dinner with friends or a wedding party with lots of good food.

Health behaviours such as exercising, healthy eating, getting sufficient sleep, or adhering to medical advice are very important determinants of health and well-being in Western societies. Vice versa, failing to perform such behaviours is related to unfavourable outcomes even to the extent that today's most pressing health issues are lifestyle related rather than caused by infections or other less controllable factors (World Health Organization, 2011). Hence, the promotion of health behaviours is considered of utmost importance by academics and health professionals alike.

Psychologists have come up with various accounts to predict health behaviour performance and explain failures to adhere to long-term health goals. Among those accounts, stage models distinguishing between particular phases of health behaviour change stand out in explaining why people fail to act upon their good intention to behave more healthily (e.g., Health Action Process

Approach model, Schwarzer, 1999; Transtheoretical Model of Change, Prochaska & Velicer, 1997). While most stage models distinguish four or more stages of behaviour change, the most prominent stage distinction is one between motivation and volition (Gollwitzer, 1990). That is, these models particularly recognise that merely having a general goal to stay healthy is not the same as having a concrete plan on *how* to stay healthy; and that even having specific behavioural intentions is no guarantee for actual behaviour change. Indeed, it has become apparent that behavioural intentions are only moderately related to corresponding behaviour (Sheeran, 2002; Webb & Sheeran, 2006) – a discrepancy which is often blamed on people's impulsive tendencies that lead them to prioritise the here and now above more rational and distant (health) goals (e.g., Hofmann, Friese, & Wiers, 2008). In this paper, we highlight a novel perspective on health behaviour failure by considering *procrastination* as a contributing factor. We argue that the failure to enact intentions does not necessarily occur because people are victims of their strong impulses, but that people may also knowingly and wilfully postpone their intended actions. While procrastination is acknowledged as a factor associated with intention-behaviour gaps in other domains, such as achievement and performance (e.g., Steel, 2007), it has surprisingly received only very little attention in the domain of health behaviour. This paper describes how the procrastination account relates to the intention-behaviour gap as we know it, what is known about procrastination and health behaviour, and what theoretical and practical implications can be derived from the addition of this novel perspective to our understanding of health behaviour change.

### The intention-behaviour gap

From early theoretical models of health behaviour (e.g., Health Belief Model, Janz & Becker, 1984; Theory of Planned Behaviour, Ajzen, 1991) we learned a lot about factors that predict people's behavioural intentions. For example, attitudes, perceived social norms, and behavioural control are all important predictors of people's intentions to perform a specific behaviour. While actual behaviour was typically considered only the final step in such models, following directly from intentions, studies consistently showed that the prediction of behaviour by intentions was actually far from optimal (Sheeran, 2002). People may feel committed to staying healthy and intend to behave accordingly, but this does not mean that they will actually do it. Thus, many problems related to health behaviour (e.g., unhealthy diets, a lack of physical activity) are now believed to be not necessarily due to a lack of motivation or good intentions, but rather to a failure to enact them (e.g., Rhodes & Dickau, 2012). Put differently, establishing good intentions – also called the 'motivational phase' of behaviour change – is necessary but not sufficient to ensure congruent behaviour (e.g., Achtziger & Gollwitzer, 2008). In a subsequent 'volitional phase', the challenge is to turn these intentions into behaviour.

The ability to attune one's behaviour such that it is in accordance with intentions is labelled 'self-regulation' (e.g., De Ridder & De Wit, 2006; Mann, de Ridder, & Fujita, 2013). Although some people adhere to their intentions better than others, many will recognise moments of self-regulatory failure. A classic example of failing to translate intentions into behaviour is that of New Year's resolutions that are often let go of within the first weeks of the year: someone may have had strong intentions to go for a run at least once a week, only to confess after a few months that his running shoes still look as good as new. Often, giving up on good intentions occurs after only a few weeks (Marlatt & Kaplan, 1972).

There are several possible explanations for the gap between intentions and behaviour. One reason why people may not act in accordance with what they would like to do is that they do not possess the required skills or resources. For example, someone who plans to cook healthier meals but has no idea how to prepare vegetables may not be successful in achieving his goal. Similarly, someone who intends to exercise more but has no financial resources to pay for a gym membership may also experience trouble enacting his or her good intention. Also on a broader level it has been acknowledged that people differ in their abilities to plan ahead, recognise obstacles, and deal with

temptations, for example in the literature on proactive coping skills (Aspinwall & Taylor, 1997). For people with low self-regulation skills as such, intention–behaviour gaps are all the more likely to occur.

It may also be the case however, that people do have the intentions and the skills and still do not perform the intended behaviour. Typically, this would be blamed on factors or circumstances that make people temporarily more impulsive and, consequently, geared more towards immediate satisfaction rather than towards rational considerations or future benefits. Given that many health behaviours are not necessarily considered pleasurable (e.g., drinking water with your meal) while their tempting alternatives would provide much more immediate gratification (e.g., having a nice glass of wine), a dominant impulsive system is considered a major threat for health behaviour performance. For example, research has shown that people are less likely to behave in accordance with their long-term goals when they are in a state of physiological arousal (e.g., Nordgren & Chou, 2011; Van den Bergh, Dewitte, & Warlop, 2008), under the influence of alcohol (Hofmann & Friese, 2008), mentally exhausted (e.g., Vohs et al., 2014), or driven by strong visceral states such as hunger (Loewenstein, 1996; Nordgren & Chou, 2011). In these situations, reflective, goal-oriented behavioural processes seem powerless. Thus, in this line of thinking, failure to adhere to one's goals is due to automatic, impulsive processes taking precedence over reasoned considerations (for an insightful review, see Hofmann et al., 2008).

Only recently, a third route to self-regulatory failure has been proposed: rather than being caused by a lack of skills or impulses taking precedence over rational considerations, late insights on 'self-licensing' show that people may also use reason to justify 'bad' behaviour (De Witt Huberts, Evers, & De Ridder, 2014). In this case, people allow themselves indulgences (e.g., having a chocolate chip cookie despite being on a diet, or buying new shoes even though the money was meant to go to the savings account) while relying on justifications that relieve them from feeling guilty. For example, a celebration, a good or a bad mood, an achievement or a failure, can all function as justifications that people use to allow themselves to temporarily discard their good intentions. In a related vein, compensatory health beliefs can be employed to warrant indulgent behaviour: 'I can have a piece of cake now, because I will go to the gym tomorrow' (Rabiau, Knäuper, & Miquelon, 2006). It should be noted that people rely on such justifications even when they have the capacity to reflect on their behaviour and to engage in planning how they will enact their intentions, thus ruling out an explanation of impulses taking over behavioural regulation. This recent contribution to the self-regulation literature on health behaviour suggests that – different from previous accounts emphasising the role of lacking skills or strong impulses – people may deliberately set aside their health goals and prioritise satisfaction of immediate needs when they have a license to do so.

In this same realm, we propose that *procrastination* is a way in which people knowingly and willfully fail to perform an intended behaviour. Similar to the use of justifications, we state that this form of self-regulation failure is based on reflective, reasoned processes. Where self-licensing refers to allowing oneself to indulge in guilty pleasures, procrastination involves allowing oneself *not* to do something (at this moment). Procrastination does not necessarily rely on justifications, although having a license (e.g., feeling that you do not need to go to the gym today because it is your birthday) may certainly foster procrastination. Importantly, procrastination – 'the voluntary delay of an intended course of action despite expecting to be worse off for the delay' (Steel, 2007) – is not the same as goal disengagement. Procrastinators are still planning to perform the behaviour they are delaying and therefore the high-level goal is believed to remain intact (Dewitte & Schouwenburg, 2002; Van Eerde, 2000).

Procrastination is thus considered a typical case of self-regulation failure where initial intentions are not enacted although, importantly, intentions remain intact as they are not abandoned but just saved for another occasion. Surprisingly, though, procrastination has hardly been studied in the context of health behaviour. While being recognised as a generalised personality trait, procrastination research has mostly been restricted to the domains of work and academic behaviour (e.g., Lay, 1986; Schouwenburg & Lay, 1995; Steel, 2007). Strikingly, studies showed that 15–20% of the general

population would call themselves *chronic procrastinators* (e.g., Ferrari, O'Callaghan, & Newbegin, 2005; Harriot & Ferrari, 1996). This suggests that, for one, procrastination may have a large impact in people's daily life, and second, that this is not necessarily confined to studying or work behaviour. We propose that health behaviour procrastination is an important form of procrastination as well, that has relevant implications for understanding self-regulatory failure in this domain.

## Procrastination

Procrastination has been defined as 'the voluntary delay of an intended course of action despite expecting to be worse off for the delay' (Steel, 2007). Others have further emphasised that the delay needs to be *needless*, where no actual constraints (e.g., situational demands) prevent the behaviour from being executed. For example, when someone is not able to go to the gym because he or she had to stay home with a sick child, it would not be considered procrastination. Furthermore, it has been argued that someone who procrastinates may not necessarily explicitly 'expect to be worse off', which would imply that the pros and cons of the decision to delay a behaviour would have been carefully weighed. Instead, it is proposed that the act of procrastination should have 'foreseeably negative outcomes': any reasonable person could foresee that delaying the behaviour has unfavourable consequences (Anderson, in press; Kroese, Nauts, Kamphorst, Anderson, & De Ridder, in press).

Many factors that are typically associated with general procrastination are related to personality. Most notably, procrastination has been consistently associated with low trait self-control, such that people who have trouble resisting temptations or inhibiting their impulses are also more likely to procrastinate on certain tasks (Steel, 2007). However, it is important to realise here that these associations may not always be a reflection of procrastination in the strict sense of 'voluntary delay' but rather in the sense of 'not finishing jobs on time', where people with low self-control may not actually decide to postpone their duties but simply get too involved in other activities. This latter case would be more reflective of the impulsive route towards self-regulatory failure as touched upon above, which is explicitly different from the reasoned procrastination route we put forward in this paper. Nonetheless, people with low self-control are indeed known to be more likely to choose immediate satisfaction over future benefits and may therefore also be inclined to choose to delay activities they ought to do. Relatedly, procrastination is strongly inversely related to conscientiousness, a central personality trait that is roughly defined as the diligent fulfilment of objectives and in that sense has a conceptual overlap with procrastination (Steel, 2007).

Associations with other individual characteristics further show that procrastination is indeed deliberate. Meta-analytic evidence shows that procrastination occurs more often among people with low self-efficacy or low self-esteem, which has been interpreted as showing that procrastination is used to protect oneself from expected failure (Steel, 2007). More specifically, Ferrari and Tice (2000) showed for example that participants who were insecure tended to procrastinate more than those who were more self-confident, but only when the task they had to perform was framed as an important intelligence test, and not when the same task was framed as a 'fun game'. This shows that procrastination is not related to lacking the skills to do something, but is wilfully used – in this latter case as a form of self-handicapping. In the health domain, we could think of an example of someone who wants to quit smoking, but keeps delaying his quitting attempt because he fears to fail at it.

More generally, some form of aversion to a certain task is found to be an important predictor of (academic) procrastination: the more aversive people feel towards a task, the more likely they are to postpone it (Steel, 2007). This could be related to fear of failure (someone may not like to do something that he fears could fail), but also to mere task characteristics: doing the dishes, for example, could be something that people do not enjoy and may therefore tend to delay. Also in the health domain one could think of 'tasks' that are typically not considered enjoyable: people may perceive many barriers to go to the gym, dieting is not something one would do just for fun, and quitting smoking can have very unpleasant by-effects in the short run.

While the immediate result of deciding to delay an intended course of action may yield some form of relief – the smoker may feel quite comfortable with the idea of not having to go through withdrawal symptoms right now – the consequences of procrastination in the long run are (by definition) less favourable. Besides obvious potential consequences of procrastination such as missing deadlines or reduced performance, it has been shown, for example, that academic procrastinators tended to feel less stressed than non-procrastinators in the beginning of the semester, but experienced more stress towards the end (Tice & Baumeister, 1997). In a health context, it was shown that people who planned to start a diet next week consumed more now compared to people who did not plan to diet, which may ironically lead to weight gain rather than their intended weight loss (Urbszat, Herman, & Polivy, 2002). Similarly, postponing your exercise routine may decrease the chances of being able to fit in your wedding dress on time, and delaying medical checkups may even lead to more serious health consequences. Below, we further elaborate on what is known on the relation between procrastination and health outcomes.

### Procrastination and health

While procrastination of health behaviour has hardly received any research attention, anecdotal evidence reveals that procrastination is recognised in the health behaviour domain as well. The examples provided throughout this paper serve to illustrate this point. One area that did yield research of relevance to the current context, however, is treatment seeking delay. Obviously, postponing treatment can have hazardous consequences in terms of health, especially when a disease may be progressive. For example, it has been investigated what factors influence the delay between discovering an abnormality during breast self-examination and presenting it to a physician. Among other factors, education level, access to health care, and perceived practical constraints were found to play a role (e.g., Facione, Miaskowski, Dodd, & Paul, 2002). Treatment seeking delay has also been studied for other types of complaints, for example those where embarrassment may play a role. Indeed, embarrassment was found to be a predictor of treatment delay when facing complaints such as urinary incontinence (Norton, MacDonald, Sedgwick, & Stanton, 1988), sexually transmitted diseases (Leenaars, Rombouts, & Kok, 1993), or mental health problems (Clement et al., 2015). Particularly when findings point towards factors suggesting *aversion* to go and see a doctor (e.g. because of embarrassment), rather than lacking knowledge or skills, parallels to procrastination research might be drawn. That is, although these studies were not specifically framed from a perspective of procrastination, it is clear that postponing treatment does involve the critical elements of needless delay and foreseeably negative consequences that would be characteristic of procrastination.

Other work more specifically considered associations between (general) procrastination and health outcomes. For example, as alluded to above, it was found that academic procrastinators tend to have more stress and poorer health (Tice & Baumeister, 1997) and that procrastination is associated with lower well-being (e.g., Krause & Freund, 2014). The impact of (general) procrastination on mental health was also reviewed by Rozental and Carlbring (2014), who highlight the problems associated with delaying everyday commitments among clinical populations. Furthermore, indirect evidence also showed that conscientiousness – the personality trait with which procrastination is most strongly (negatively) associated (Steel, 2007) – was negatively related to risky health-affecting behaviours (e.g., alcohol use, risky sexual behaviour) and positively related to beneficial health-affecting behaviours (e.g., healthy diet, physical exercise; Bogg & Roberts, 2004). More specific to the current topic is the work conducted by Sirois and colleagues, who not only looked at health outcomes but also considered potential explanations for the relation between procrastination and poor health. It was shown that general procrastination was associated with treatment delay and the practice of fewer wellness behaviours (Sirois, 2007). Similar relations have also been found in the mental health domain, where procrastinators were found to delay help-seeking for mental health problems (Stead, Shanahan, & Neufeld, 2010). Moreover, it has been demonstrated that procrastination is significantly related to illness, and that this relation was mediated by higher stress levels and greater

treatment delay (Sirois, Melia-Gordon, & Pychyl, 2003; Sirois & Tosti, 2012). Thus, there seems to be a consistent relation between procrastination and health outcomes. At the same time, it should be noted that procrastination in these studies was not assessed in particular relation with the health behaviours per se: that is, health outcomes were associated with general or academic procrastination, but the notion that people would particularly procrastinate on health behaviours was only implicitly made.

In our own recent work we highlighted a specific health context in which procrastination also plays a significant role, namely sleeping behaviour. Although sleeping behaviour does not yet have a prominent position in health psychology literature, it is increasingly being recognised that getting sufficient sleep is essential to people's mental and physical well-being (e.g., Haack & Mullington, 2005; Strine & Chapman, 2005). Bedtime procrastination, defined as 'going to bed later than intended while no external influences are accountable for doing so' (Kroese, De Ridder, Evers, & Adriaanse, 2014; Kroese, Evers, Adriaanse, & de Ridder, 2014), was found to be significantly associated with general procrastination. More importantly, it was related to experienced insufficient sleep, actual hours of sleep and daytime fatigue above and beyond the predictive value of trait self-control. This suggests that bedtime procrastination cannot be fully accounted for by inhibitory control problems. Anecdotal evidence reveals that many people are familiar with knowingly and wilfully going to bed later than they should, while realising they would regret it the next day. Our data indeed showed that going to bed later than planned was a phenomenon that was recognised by a large proportion of the sample, consisting of a representative group of adults from the general population. The authors reasoned that going to bed is probably a behaviour that is a particularly good candidate for procrastination: you know that you will eventually do it, but the evening – especially with our current 24/7 entertainment industry – presents many tempting distractions (e.g., watching TV, playing computer games) that may seem more attractive than going to bed. Hence, though knowing they may experience negative consequences the next morning, procrastinators appear to have a tendency to delay their bedtimes and thereby limit their hours of sleep. As such, this novel perspective on sleeping behaviour provided another example of how procrastination may affect health behaviour.

It is important to further consider the distinction between procrastination and inhibitory control issues in health behaviour failures. For one, it must be noted that the two concepts show some empirical overlap when assessed with self-reports. People who tend to experience inhibitory control problems (e.g., having the chocolate cake instead of the fruit salad) apparently are also more likely to postpone their duties. Procrastination has therefore sometimes been regarded as just another illustration of inhibitory control problems. Conceptually, though, it is essential to distinguish between these two types of self-regulatory failure. One relevant difference is that procrastinating on a task is more than 'not doing it now'; it also involves the (implicit) promise to do it later. Moreover, as discussed before, we argue that, whereas inhibitory control failures are typically blamed on a dominant impulsive system, health behaviour procrastination is a reasoned route to self-regulatory failure. That is not to say, however, that impulsive processes cannot play a role in procrastination at all. It is quite plausible, for example, that (particularly chronic) procrastinators are more easily tempted by choice options that provide immediate gratification. In these cases, the distinction between inhibitory control problems 'as we know them' and procrastination becomes less obvious. For the sake of the current argument – introducing procrastination as an additional perspective to consider health behaviour failures – we choose to focus on the clear illustrations of (reasoned) procrastination rather than the inevitable grey areas between inhibitory control and procrastination.

To also empirically distinguish inhibitory control from procrastination, we suggest that it is particularly interesting to consider procrastination of health behaviours per se. Earlier research on procrastination and health has mostly been concerned with associations between generalised procrastination and health outcomes. However, associations between *general* procrastination and poor health (behaviours) can partly be confounded by underlying low self-control skills: for example, people who have low self-control may not only get easily distracted and decide to postpone their duties, but are also more likely to fall for the chocolate cake instead of the fruit salad. In this

example, poor health because of eating too many chocolate cakes is not caused by procrastination, but a common underlying trait (i.e., low self-control) leads to both negative outcomes. To establish that poor health outcomes are due to procrastination, studies need to more specifically address procrastination in this very context. The emerging work on bedtime procrastination has focused specifically on postponing going to bed and showed that it predicted sleep outcomes above and beyond general self-control. These findings provide initial empirical support for our conceptual proposition that reasoned procrastination is a distinct phenomenon that may contribute to poor health behaviour beyond general inhibition problems related to low self-control. However, data on this topic are still scarce and other relevant empirical questions in this regard are pinpointed below when we discuss implications and avenues for future research. First, we consider a number of factors that may contribute to health behaviour procrastination.

### Why do people procrastinate?

What may be attractive in procrastination is that it does not mean that you disengage from your goals – you are surely still planning to do it! – making it well justifiable to loosen the reins right at this moment. As touched upon before, putting off an intended behaviour may function as a valid excuse for not doing it now: not going to the gym today does not feel like failure if you plan to go tomorrow. In this way, procrastination might be used strategically to ease one's mind from the uncomfortable feeling of not sticking to your plans. This does not yet explain, though, why people fail to do their intended task in the first place.

As discussed above, one reason to put off a behaviour may be that people simply do not like to do it (i.e., task aversiveness). In fact, this could be considered a very reasonable argument for reprioritising one's to-do-list, especially when someone is not in his best mood. Short-term mood regulation may then get higher priority than doing something that is beneficial in the long run but not particularly pleasant right now (Sirois & Pychyl, 2013). Besides the mere enjoyment of a task itself, task aversiveness has also been found to be positively related to a lack of autonomy (i.e., the extent to which a task is prescribed by others), stress, and a weak relation between a task and someone's self-identity (Blunt & Pychyl, 2000). Thus, these factors could all be contributing to people's aversion to perform a behaviour, and consequently to their tendency to delay. Nonetheless, it is important to keep in mind that the definition of procrastination is confined to situations in which people do have a behavioural intention. Thus, someone is initially committed to doing something, but may for example feel averse to getting started or to a particular part of the task.

Relatedly, feeling insufficiently capable of performing the task (i.e., low self-efficacy), or experiencing a lack of control over the behaviour (i.e., low perceived behavioural control) can also contribute to people being reluctant to execute a behaviour. Whereas at first sight such factors may be more likely to play a role in the context of difficult academic tasks – where procrastination has been studied mostly – rather than health behaviours that can be quite straight-forward (e.g., eating fruits, taking vitamins), self-efficacy or perceived behavioural control are indeed typically found to be negatively related to intentions and behaviour in the health domain as well (Ajzen, 1991; Strecher, DeVellis, Becker, & Rosenstock, 1986). A connection to procrastination, however, has not often been made. That is, in the health domain it is not established that a lack of self-efficacy may explain people's tendency to delay certain behaviours. Notably, though, Sirois (2004) provided some first indication that self-efficacy indeed mediated the relationship between procrastination and intentions to perform specific health behaviours.

Another factor that may contribute to procrastination is a lack of specificity of people's intentions (Van Eerde, 2000). When an intention is formulated in vague terms (e.g., 'I will eat more healthily'), it is less likely to be enacted than when a more specific plan is made (e.g., 'I will eat an apple with my lunch tomorrow') – a notion that has become well-known through the work of Gollwitzer (1999) on implementation intentions, showing that performance in terms of intention enactment is drastically improved when people make plans that specify when, where, and how they are going to act.



Whereas the failure to act upon unspecified intentions has also been regarded as being due to failing to recognise good opportunities to act (e.g., Webb & Sheeran, 2004), another explanation would be that as long as the how, when, and where of an intention are not specified it is easier to justify postponing the actual action (e.g., intending to go to bed 'on time' tonight can still have variable interpretations, whereas intending to go to bed at 11 pm would leave less room for delay). Interestingly, a lack of specificity may well be connected to the factor of task aversiveness discussed above: if a behaviour is not liked, people may be less motivated to make specific plans. In fact, procrastination has also been labelled 'the avoidance of implementing an intention' (Van Eerde, 2000).

Finally, a more general notion that seems to be left relatively unaddressed in recent literature is that intentions are not static. Research has typically been concerned with identifying differences in intentions *between* individuals, which are then for example considered as outcomes of interventions or predictors of behaviour on a group level. Importantly, though, intentions vary *within* individuals possibly just as much as between individuals (e.g., Conroy, Elavsky, Hyde, & Doerksen, 2011). One moment (e.g., when noticing his jeans do not fit anymore), someone may have a strong intention to get more exercise, while a few hours, days, or weeks later the intention may be weak at best – only to revive again later. This 'waxing and waning' of intentions (see also Kuhl, 1987) may explain why, even though people do report overall adequate behavioural intentions, they may sometimes deliberately choose to procrastinate. Indeed, it has been found that unstable intentions are less likely to be enacted (Sheeran & Abraham, 2003; Sheeran, Orbell, & Trafimow, 1999). Hence, it is plausible that dynamic intentions play an important role in procrastination as well: the very fact that someone knowingly postpones an intended action implies that this action at least has got some lower priority at that moment. This is different from self-regulation failure through the 'impulsive route' where an intention is overruled by hedonic urges and does not have a chance to determine behaviour. Surprisingly, the phenomenon of dynamic intentions has not yet been subject to study in procrastination research. This would be one of our first suggestions for future research, which we further discuss below.

## Implications and future directions

Considering procrastination as an alternative route towards self-regulatory failure in the context of health behaviour has important implications. For one, whereas the failure to perform health behaviours has mostly been ascribed to the impulsive system taking precedence over the reflective system, the procrastination account suggests that a reflective route can also lead to self-regulatory failure. In other words, 'even when people have the resources and capacity to act in accordance with long-term goals, they may not always act upon them (...)' (De Witt Huberts et al., 2014, p. 14). Consequently, the factors that contribute to this reasoned route to self-regulatory failure may be different than those that are typically considered in the domain of health behaviour. This has obvious implications for potential intervention strategies as well, on which we speculate below.

Another important implication of considering procrastination as a phenomenon where people knowingly and wilfully postpone an intended health behaviour is that it could be a particularly dangerous route to self-regulatory failure as people may not immediately experience it as such. While impulsively going for the chocolate mousse instead of the fruit salad for dessert may directly be construed as an instance of self-regulatory failure, merely *delaying* a desired behaviour is in some sense less definitively 'wrong' (in the future there's another chance to succeed!). In this way, people can negotiate with themselves and extenuate their failure to act in line with their intentions. This may lead to situations where people make the same resolutions over and over again, without actually behaving accordingly. An illustration of this phenomenon has been documented by Polivy and Herman (2002), who labelled it 'the false hope syndrome': despite experiencing failure, people over and over believe they will be able to change their behaviour. A perspective as such points to the importance of considering people's potential *overconfidence* in their ability to change their behaviour. While health psychologists may have mostly considered a lack of confidence (e.g., low

self-efficacy) as a reason for self-regulatory failure, overconfidence as the other side of the coin could be just as dangerous when people too easily justify delaying their intended action with the excuse of 'surely being able to do it later'. Thus, this is another way in which a procrastination perspective may bring about relevant additions to the ways we think of health behaviour failure.

It is important to keep in mind, however, that the decision not to perform a behaviour right at this moment may – in spite of the general tone of this paper – not necessarily always be a case of 'self-regulatory failure'. That is, not all delay is procrastination in the sense that someone 'expects to be worse off'. Instead, one could argue that an intended delay of action may sometimes be strategic when a person is pursuing multiple, competing goals. For example, someone may decide to go running tomorrow instead of today because he prefers to have drinks with his friends who are in town only today. While going out with friends does not serve his exercise goal, it can be a wise choice if it satisfies his goal to have a fulfilling social life (e.g., Rawn & Vohs, 2011). This notion aligns with insights on the strategic allocation of efforts to competing goals (Kurzban, Duckworth, Kable, & Myers, 2013; Louro, Pieters, & Zeelenberg, 2007). Similarly, when someone would rightly expect to fail, delaying action may be beneficial to protect one's self-esteem: perhaps next week would indeed be a better time to start dieting (Rothermund, 2006; Wrosch, Scheier, Carver, & Schulz, 2003). Particularly when complete disengagement would be the alternative (e.g., when someone considers his attempt to quit smoking as failed altogether if he did not succeed in doing it on a predefined date), postponement might not be the worst choice after all. Thus, essentially, merely considering the outcome (whether or not a behaviour is performed as intended at a specified time) is not sufficient to speak about procrastination, or self-regulatory success or failure.

Altogether, it is clear that procrastination of health behaviour has relevant implications while being relatively understudied. Hence, we advocate giving greater priority to research investigating this phenomenon. Below, we outline some promising roads for future research. Of course, a first necessary step is to investigate the role of procrastination in various health behaviours. As outlined in this paper, we have strong reason to suspect that procrastination will be a relevant factor in explaining why people do not do what they intended to do, next to factors that are typically considered in health behaviour failure. At the same time, however, we found that empirical data are lacking. It may well be the case that procrastination is more relevant for some behaviours (e.g., sleeping, exercising, making doctor's appointments) than others (e.g., healthy eating), but at this point that would be mere speculation.

Second, it would be interesting to study the dynamics of intentions: rather than assessing health behaviour intentions at baseline only, repeated assessments could provide valuable information on the stability of intentions. Building on initial work on temporal stability of intentions (Conroy et al., 2011; Sheeran & Abraham, 2003), the use of experience sampling methods, for example, could lead to insights into how intentions may change whenever people encounter difficult situations or when they approach their planned moment of action: are intentions to act reduced prior to deciding to procrastinate, or do they remain stable? Alternatively, it could be the case that intentions are reduced but once the decision to procrastinate is made, people's intentions immediately return to their original level ('I just thought I didn't really feel like going to the gym, but now that I plan to go tomorrow I am really motivated again'). It would be an interesting, yet challenging, question whether dynamic intentions in the context of procrastination can empirically be distinguished from strategic (temporal) reductions in motivation for a task, for example in competing task paradigms where individuals allocate effort to tasks based on opportunity cost computations (Kurzban et al., 2013). Gaining insights into these processes is essential to further our understanding of procrastination and finding ways to reduce it.

Another question for future research is whether possible subtypes of procrastinators could be identified. It has been suggested, for example, that 'passive' and 'active' procrastinators can be distinguished (Chun Chu & Choi, 2005), where the former are paralysed by their indecision to act, while the latter type deliberately procrastinates certain tasks but does not experience any negative

consequences from this behaviour (e.g., people that like to work under time pressure). Alternatively, we could speculate about a distinction between people who explicitly decide to postpone an action and plan when to do it in the future (e.g., 'I do not feel like going to the gym today but I will go tomorrow') versus those who merely experience trouble getting started because they are not sure how to go about, or because they feel aversion to committing themselves to specific action plans (Anderson, in press; e.g., 'I did not yet start my diet but once I have a good diet book I will start immediately').

Finally, an important road for future research is to investigate strategies that could prevent procrastination in the domain of health behaviour. As alluded to above, it may be worthwhile to target specific cognitive determinants of procrastination. For example, if task aversiveness is indeed found to play a role in health behaviour procrastination, strategies could focus on ways to encourage positive reappraisal of the behaviour. This goes beyond increasing goal intentions or motivation: being truly motivated to stay physically fit does not necessarily mean that people have positive attitudes towards the behaviours that are required to attain this goal. Hence, if going to the gym could be reappraised as 'a nice way to spend time with a friend and be active at the same time' rather than 'tedious but necessary' this may be an effective way towards decreasing procrastination. Cognitive restructuring strategies as such could also be used to try and adapt other procrastination-enhancing (irrational) cognitions such as self-doubt or low self-efficacy into more positive appraisals (see also Rozental & Carlbring, 2014). Furthermore, strategies that help people to make more specific plans are promising as well (Gollwitzer, 1999). Indeed, implementation intentions are generally found to be very effective in promoting health behaviour, and some first evidence on the effectiveness of these specific plans in reducing procrastination suggests that they may be helpful in this specific area as well (e.g., Owens, Bowman, & Dill, 2008; Wieber & Gollwitzer, 2010). Finally, we could think of strategies that do not allow deliberate procrastination because people are automatically triggered to perform the intended behaviour. Facilitating automaticity and routines, for example by using time schedules for certain tasks, has indeed been suggested as a promising avenue for behavioural procrastination interventions (Rozental & Carlbring, 2014). Along the same lines, De Ridder, De Vet, Stok, Adriaanse, and De Wit (2013) have stressed the importance of 'appropriateness standards': social rules or norms that can automatically guide behaviour while relieving the individual of the decision to act. In addition, recent work has demonstrated the power of *nudging* as a way in which people can gently be guided in the right direction (Thaler & Sunstein, 2008). An example in the context of procrastination could be related to making doctor's appointments. While making an appointment for a yearly checkup may be something that procrastinators are typically likely to delay, smart adjustments to reminder notifications (e.g. including a time slot in which people should call, or including a 'default' preset appointment with an opt-out opportunity) may make it much easier for people to comply.

## Conclusion

In sum, we posit that procrastination of health behaviour is a relevant but understudied phenomenon that is worthwhile to pay more attention to both in research but also in practices of those who aim to promote health behaviour. It is particularly important to recognise the waxing and waning of intentions: rather than being truly abandoned, intentions may sometimes be temporarily put aside. In addition to self-regulatory failure due to a lack of skills or driven by impulsive tendencies, the procrastination account implies different predictors and solutions that may contribute to finding the most effective ways to improve health behaviour.

## Disclosure statement

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