

CHAPTER 8

When Time Matters Most: A Critical Discussion

8.1 Thesis overview

This thesis aimed to address a significant and consequential gap in the psychological literature: the nature, mechanisms, and real-world implications of procrastination in older adulthood, to in part address the paucity of lifespan research concerning procrastination. Within this thesis five empirical studies were carried out. Each of these studies investigated a distinct, but theoretically interconnected part of this problem. The empirical studies began by investigating affective mechanisms (Chapter 3), before moving onto both social evaluative contexts (Chapter 4) and motivational processes (Chapter 5), and finally culminating in two respective real-world consequences, health utilisation (Chapter 6) and cognitive decline (Chapter 7). Taken together, the findings of this thesis are not merely an accumulation of evidence, but additionally speak to how and why procrastination matters in later life, and more broadly why procrastination urgently matters for public health.

The goal of this final chapter is threefold: i.) to synthesise the key findings across the studies, with the lifespan-informed model proposed in Chapter 1 in mind; ii.) to identify the theoretical and empirical contributions of the thesis as a whole, considering limitations and directions for future research; and iii.) to consider the broader real-world implications of this body of work, situating this work within the wider public health landscape of population ageing.

8.2 Revisiting the lifespan-informed model

The lifespan-informed theoretical framework proposed in Figure 1.3 drew upon several theories from the lifespan and motivational literature. These included: Socioemotional Selectivity Theory (SST; Carstensen, 2001; Carstensen et al., 1999), Temporal Motivation Theory (TMT; Steel and König, 2006; Steel et al., 2018), Self-Determination Theory (SDT; Deci and Ryan, 2009), Selective Optimisation with Compensation (SOC; Baltes and Baltes, 1990), Regulatory Focus Theory (Higgins, 1997, 1998), Environmental Press Theory (Lawton & Nahemow, 1973), and Terror Management Theory (Greenberg et al., 1986). Rather than proposing a single causal explanation for procrastination in later life, the framework brought these perspectives together to organise the developmental, motivational, affective, existential, and environmental factors that may contribute to procrastination in older adulthood.

The empirical findings presented throughout this thesis provide varying levels of support for different components of this framework (see Figure 8.1). While several conceptual domains were well supported, others required refinement, and some remain largely untested. Taken together, the findings suggest that **procrastination in later life reflects a dynamic developmental system shaped by interacting affective, motivational, social, cognitive, and contextual processes**. Each of these processes

will now be considered in turn, in the context of specific model components discussed in Chapter 1, and in the context of this synthesizing claim.

8.2.1 The affective process

Evidence from Chapter 3 provided strong support for the importance of affective processes within the model. Specifically, depressive symptomatology functioned as a partial mediator in the relationship between procrastination and age. As such, depressive symptomatology may represent an important domain through which age-related challenges translate into inaction. More specifically, this relationship may be driven by symptoms such as fatigue, motivational depletion, and feelings of loneliness, as per the exploratory symptom analysis (Table 3.2). Furthermore, the findings from Chapter 6, provide an illustration of such inaction by demonstrating that depression and procrastination can interact with one another to lower the probability that older adults would engage in preventive health behaviours, such as prostate exam and dental visits (see Figure 6.1).

Critically, this affective pathway could be understood through the lens of TMT. Negative emotional states can undermine self-efficacy and motivation (Nie et al., 2025), which in turn may undermine how “likely success feels” for a given task (i.e., the *expectancy* component of the TMT equation). As such, when success feels less likely and the energy needed for completing a task is reduced, the motivational force to initiate a task (even a protective health related task) is substantially reduced (Steel et al., 2018). Additionally, from a lifespan perspective, both SDT and SOC emphasise the importance of maintaining motivational resources for adaptive functioning in later life (Baltes & Baltes, 1990; Deci & Ryan, 2009). However, negative emotional states may undermine these resources (Fiske et al., 2009) and subsequently, the initiation and maintenance of goal-directed behaviour. As such, the evidence presented in this thesis is consistent both with the synthesized claim and with existing models of procrastination.

8.2.2 The temporal motivational process

Chapter 5 provided an opportunity to evaluate one of the central conceptual assumptions of the framework. Drawing on SST, the lifespan-informed model proposed that a limited future time perspective would reconfigure task motivation. Specifically, a reduced sense of remaining time was expected to decrease procrastination by increasing the perceived importance of acting in the present.

The findings provided partial support for this assumption. As shown in the posterior distributions of Figure 5.2, there was a small positive association between subjective remaining life and procrastination. In other words, individuals who perceived more time remaining in life reported higher levels of procrastination. However, the findings also suggest that this relationship was more complex than what

was originally proposed. Subjective remaining life did not moderate the relationship between temporal orientation and procrastination (Figure 5.3). In fact, the posterior distributions (Figure 5.2) showed that a stable future-oriented disposition was a stronger negative predictor of procrastination than subjective remaining life. One interpretation of this may be that future orientation and subjective remaining life capture related (albeit conceptually distinct) aspects of temporality. While subjective remaining life captures an individual's appraisal of how much time they believe remains in life, future orientation reflects broader reflects a broader dispositional tendency to consider, value, and invest in future outcomes (Zimbardo & Boyd, 1999). Individuals who place habitually place less emphasis on the future consequences of their actions develop a cognitive present-oriented temporal bias (Zimbardo & Boyd, 1999), which is known to be related to procrastination (Sirois, 2014a). Consequently, while perceiving less time remaining in life may alter motivational priorities (Carstensen, 2001), this alone may be insufficient in altering procrastination if an individual's broader temporal disposition remains unchanged.

Taken together, this suggests an important refinement to the role of SST within the lifespan model and within procrastination in later life as a whole. Rather than influencing procrastination by simply making people more aware of limited time, SST may be better conceptualised as providing a broader developmental context within which motivational priorities change, rather than specifying a direct explanation for procrastination itself.

8.2.3 Behavioural and health consequences

The final two empirical studies (Chapters 6 and 7) extended the conceptual framework by highlighting the further downstream consequences of procrastination in later life.

Chapter 6 showed that higher levels of procrastination was associated with reduced engagement in several important preventive health behaviours, including mammograms, cholesterol screenings, prostate examinations, and dental visits. In line with prior research (Johansson et al., 2023; Sirois, 2007; Sirois et al., 2003), these findings confirm that procrastination can undermine proactive health management even in later life, particularly when those health behaviours require planning, scheduling, and sustained self-regulation (S. Kelly et al., 2016; Turk & Meichenbaum, 1991).

Health screenings, by their very nature, require individuals to confront the possibility of serious illness. As per Terror Management Theory, this can elicit existential anxiety within an individual (Greenberg et al., 1986). While procrastination of such health behaviours represents a self-regulatory failure, it may also represent a subtle form of death denial. This may be especially true for cancer-related health screenings (prostate exams and mammograms). For instance, Moser et al. (2014) notes that when thinking about "cancer", 60% of people automatically think about "death".

The observed interaction with depression (Figure 6.1), further reinforces this as older adults with depression may be especially susceptible to existential distress (Fiske et al., 2009).

Meanwhile, Chapter 7 demonstrated that procrastination may also function as an early behavioural marker of cognitive decline. Individuals with MCI and dementia reported higher levels of procrastination (Figure 7.2), and additional longitudinal modelling indicated that procrastination was associated with an increased likelihood of cognitive decline and a reduced likelihood of cognitive recovery (Figure 7.4). Environmental Press Theory provides an important contextualisation for these findings. As an individual's competencies decline, the complexity and demands of the everyday environment (the "environmental press") increases (Lawton & Nahemow, 1973). Tasks that were once been routine may become "high-press" demands, exceeding one's capabilities. Within this context, procrastination may represent more than just a self-regulatory failure, but also a response to a person - environment mismatch.

8.2.4 An empirical integration

When taken together, the empirical work presented throughout this thesis supports the overall conceptual organisation of the lifespan-informed model. However, the results also suggest several important refinements (see Figure 8.1). Firstly, affective states (particularly depressive symptomatology) may be a strong domain which undermines the motivation to initiate tasks. Depression consistently accompanied higher levels of procrastination and was implicated across both psychological and behavioural outcomes. Secondly, stable motivational dispositions (such as temporal orientation) appear to be more influential in shaping procrastination than context-sensitive ones (such as subjective remaining life). This suggests that the role of SST in later life procrastination is less about temporal salience and more about emotional re-prioritisation. Finally, there are multiple downstream consequences to procrastination in later life, particularly in the health and cognitive domains. Importantly, not all theories and pathways within the lifespan-informed model could be tested within the scope of this thesis. As such, these pathways and theories remain open for further investigation.

Overall, the evidence presented throughout this thesis supports viewing procrastination in later life as a multidimensional phenomenon situated within the developmental context of ageing. Rather than being simply explained by any single theory or mechanism, procrastination appears to reflect the convergence of affective, motivational, cognitive, existential, environmental, and contextual influences. Collectively the findings reinforce the value of adopting a lifespan perspective when seeking to understand why procrastination persists in older adulthood and how it may contribute to important health and cognitive outcomes.

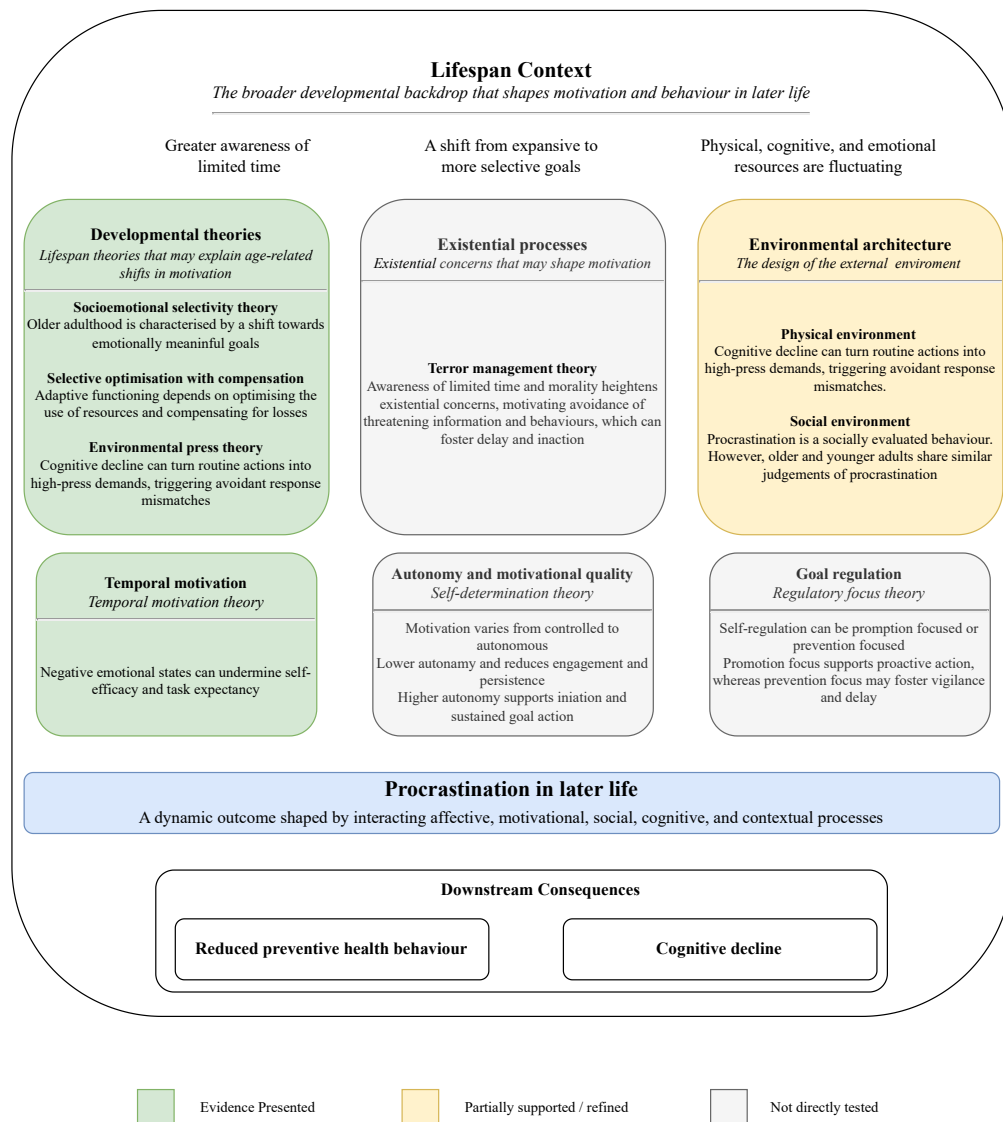


Figure 8.1: A revised lifespan-informed model of procrastination in older adulthood after empirical investigation. Overall, the model posits that procrastination in later life reflects a dynamic developmental system shaped by interacting affective, motivational, social, cognitive, and contextual processes.

8.3 Overarching themes

Individually, the empirical findings of each chapter address a distinct research question and provide insights into procrastination in later life. However, several broader themes emerge when these findings and insights are considered collectively. When taken together, these themes highlight the integrative contribution of this thesis and offer a more comprehensive picture of procrastination in later life than any single component alone. Overall, they suggest that procrastination is not simply about delaying an action, but rather it is a complex behavioural phenomenon embedded within emotional, social, motivational, and developmental systems.

8.3.1 Procrastination as a socially embedded behaviour

The first overarching theme concerns the social nature of procrastination. While often conceptualised as an internal self-regulatory failure (Klingsieck, 2013a; Steel, 2007), the findings of this thesis suggest that procrastination is also embedded within broader social contexts. Consistent with the work of Giguère et al. (2016), the findings of Chapter 4 suggest that procrastination was broadly perceived as a violation of social norms. This was particularly evident in areas characterised by important long-term consequences, such as health and financial decision-making. For many, delaying a simple task may be viewed as inconvenient. However, delaying an important medical exam or financial decision carries broader implications for both individual well-being and social responsibility (Bandaranayake & Shaw, 2016; Brown & Previtro, 2014; Ferrucci et al., 2008; Gamst-Klaussen et al., 2019; Kulminski et al., 2007; Mottola et al., 2024; Shah & Mukherjee, 2025).

Importantly, these findings also highlight an important distinction between the externalisation (social evaluation) and the internalisation (personal meaning) of procrastination. Between younger and older adults, there was a broad consensus present that procrastination was a problematic behaviour. However, younger adults reported a greater self-critical evaluation of procrastination. This suggests that while the overall social meaning of procrastination (i.e., “procrastination is bad”) remains relatively stable throughout adulthood, the way individuals interpret and respond to their own procrastination may change with age.

When considered alongside the broader findings of this thesis, these results suggest that procrastination is not a purely private act. Rather, procrastination is shaped by shared norms, interpersonal expectations, and differences in how one self-evaluates themselves. As such, to truly understand procrastination requires not only paying attention to individual motivational processes, but also to the social contexts in which the decision to act or delay occurs.

8.3.2 The cycle of depression, procrastination, and health

A second overarching theme concerns the possibility of a self-perpetuating cycle between depression, procrastination, and health. Initially, Chapter 3 suggests that depressive symptoms mediate the relationship between age and procrastination. More specifically, older adults who experience depression are significantly more likely to procrastinate. Based off the exploratory symptom analysis presented in Table 3.2, this association is likely driven by fatigue, motivational decline, and possible feelings of loneliness, which in turn may all undermine the capacity to initiate and complete tasks. Chapters 6 and 7 then show that such procrastination translates into various health compromising behaviours and cognitive decline. However, such forms of procrastination are likely to contribute to deteriorating physical and cognitive functioning, which may subsequently exacerbate depressive symptoms and further reduce an individual's motivational capacity (much like the cascading process in Figure 1.4). Although future longitudinal research would be required to test this explicitly.

This overarching theme aligns with the procrastination–health framework (Sirois, 2007; Sirois et al., 2003), which provides a conceptual basis for how procrastination may translate into downstream health consequences (albeit with a stronger focus on the role of stress). Nevertheless, a similar framework could be used to disentangle the possible self-perpetuating cycle implied here. In fact, emerging meta-analytic evidence does suggest a possible bi-directional association between procrastination and depression (Nie et al., 2025). However, the current findings extend these accounts by situating this potential cycle within older adulthood, where the consequences of repeated delay may accumulate more rapidly. When taken together, these results highlight the need for future research to more directly disentangle the temporal ordering and reciprocal dynamics implied by this cycle, and to identify leverage points for intervention to interrupt the cycle.

8.3.3 The public health significance of procrastination

A third overarching theme concerns the significance of procrastination for healthy ageing. Procrastination represents a significant and potentially modifiable public health risk in ageing populations. The collective findings of this thesis provide substantial support for this claim.

The findings from Chapter 3 are consistent with the suggestion that depressive symptoms partially mediate the relationship between age and procrastination, highlighting the importance of mental health in shaping procrastination. Late-life depression is already a public health concern (Fiske et al., 2009; Paun, 2023). With the proportion of the population over the age of 65 growing (World Health Organisation, 2025) this means that there is likely to be growing numbers of individuals impacted

by late-life depression. Given the possibility of a cyclical association between procrastination and depression, this growing increase makes procrastination a wider concern. Echoing this concern, the findings from Chapter 6 suggest that procrastination (and at the same time its interaction with depression) is associated with reduced engagement in several preventive health behaviours. Older women who reported higher levels of procrastination were less likely to undergo mammograms, cholesterol screenings, and dental visits, while older men were less likely to undergo prostate examinations and dental visits. These behaviours (mammograms, prostate exams, cholesterol screenings, and dental visits) are particularly important because they typically require an individual to plan, schedule, and act in such a way that the future version of that individual will benefit (S. Kelly et al., 2016).

Finally, and perhaps most notably, the findings of Chapter 7 suggest that procrastination may have implications for cognitive ageing. Older adults who reported higher levels of procrastination were more likely to experience transitions towards cognitive impairment. Additionally, the association between procrastination and cognitive impairment became more consequential with advancing age, such that the oldest-old (those 90+ years old) were most at risk. Even though the effect sizes for these results were quite small, the interaction between procrastination and age makes these results of concern as the oldest-old adults are already at the most risk of dementia (R. O. Roberts et al., 2015).

Collectively, these findings suggest that procrastination in later life should not be viewed as a simple bad habit or problem related to productivity. Rather, procrastination in later life appears to overlap with several domains related to successful ageing, including emotional well-being, preventive health management, and cognitive functioning. When considered from this perspective, procrastination emerges as a behaviour with meaningful public health implications.

8.4 Theoretical contributions

From a theoretical standpoint, this thesis makes several contributions to the theoretical understanding of procrastination, self-regulation, and ageing.

Firstly, to the best of the author's knowledge, this thesis is the first to i.) develop a lifespan-informed model of procrastination in older adults and ii.) empirical evaluate parts of that model across multiple studies with a core focus on older adulthood. For the most part, research into the area of procrastination has been dominated by studies and theoretical frameworks that focus on younger adults. As always, there are exceptions with some studies investigating specific aspects of procrastination in older adulthood (Biella et al., 2020; Shah & Mukherjee, 2025; Stolcis & McCown, 2018) or including older adults as a subset of a broader sample (Beutel et al., 2016; J. R. Ferrari et al., 1995; Firdaus et al., 2020; Harriott & Ferrari, 1996). However, no previous program of research has attempted to evaluate the mechanisms, social

context, motivational reasoning, behavioural consequences, and potential cognitive implications of procrastination in older adulthood. While much work still needs to be done in this field, this thesis extends the field of procrastination beyond its traditional focus on younger adults.

Secondly, this thesis contributes to the theoretical understanding of procrastination. Procrastination is typically seen as a self-regulatory failure (Rozenal & Carlbring, 2014). However, the findings presented here suggest that procrastination in later life may represent something more complex. Drawing on several lifespan developmental theories, this thesis proposes that procrastination may reflect dynamic response changes in an older adult's motivational resources and priorities, the environment they live in, as well as their overall health, emotional wellbeing, and cognitive function. Rather than viewing procrastination as an individual deficit in self-regulation, the thesis broadens the understanding of procrastination by situating procrastination within the developmental realities of ageing.

Thirdly, this thesis contributes to the growing recognition that procrastination is socially evaluated. The findings from Chapter 4 demonstrate that procrastination is more negatively evaluated in the health and financial domains. Typically, these domains are characterised by long-term consequences; procrastinating a doctor's appointment or paying a bill has more notable consequences than procrastinating starting an essay. This suggests that the social meaning of procrastination is shaped by the context in which delay occurs (Giguère et al., 2016), and that certain forms of procrastination may carry greater social and psychological significance than others.

Finally, this thesis situates procrastination as a meaningful determinant of healthy ageing. Procrastination has long been associated with health and wellbeing (see Sirois (2017) for review). However, like most studies in this field the focus has been on the health and wellbeing over the younger population. The findings from Chapter 6 suggest that procrastination in later life is associated with reduced engagement in numerous preventive health behaviours, including prostate exams, mammograms, cholesterol screenings, and dental visits. These findings tentatively build on the procrastination-health framework (Sirois, 2007; Sirois et al., 2003) by demonstrating that procrastination may have particularly important implications in later life.

This is further emphasised by the findings of Chapter 7, perhaps one of the most novel theoretical contributions of this thesis. The findings from this chapter suggest that procrastination may function not only as a determinant of healthy ageing but also as a potential determinant of cognitive decline. By cross-situating procrastination with established theories of executive function, self-regulation, and health engagement (S. M. Kelly & Walton, 2021; Rozenal & Carlbring, 2014; Sirois et al., 2003) and neurobiological pathways implicated in dementia such as, chronic stress, cortisol and hippocampal atrophy (Franks et al., 2021; Sirois, 2023; Wallensten et

al., 2023), this thesis opens a potentially novel gap in the crosshairs of behavioural psychology, gerontology, and cognitive neuroscience.

8.5 Methodological contributions

In addition to the theoretical contributions, this thesis makes several methodological contributions to the fields of statistics and data science. Each of the contributions reflects an attempt to resolve an issue that emerged as the result of a challenge in the applied questions behind the empirical work of this thesis.

First and foremost, this thesis addresses a fundamental difficulty in the evaluation of discrete-time Markov models. As noted in the methodological overview presented in Chapter 2, determining if a fitted Markov model accurately represents the transition structure of the real data is a difficult challenge and subject of ongoing research. Unlike most standard regression techniques, where residuals can be calculated and subsequently analysed, Markov models do not provide residuals in the same sense (Araripe et al., 2024). Rather they provide transition probabilities which may be converted to multivariate residuals. This makes model diagnostics and goodness-of-fit assessments challenging since they are not available by working with univariate residuals directly.

To address this, a large-scale simulation study (as outlined in Section 2.3) was conducted. Rather than relying on a global fit statistic (such as the AIC or BIC), the study developed a novel procedure for directly comparing the transition structure implied by the fitted model against the observed transition structure of the raw data. Overall, this approach provides researchers with an alternative and more nuanced diagnostic tool for longitudinal data analysis, moving beyond simple likelihood comparisons. This is especially true for research studies involving smaller sample sizes as we obtained favourable results for the distance-based diagnostics in this case, when compared to the information criteria (as per Figures 2.1 and 2.2).

Moreover, this thesis demonstrates the value of applying more flexible and advanced statistical approaches to the study of procrastination and ageing. Across the empirical chapters, a range of statistical techniques were used, including mediation analysis, multilevel modelling, Bayesian estimation, generalised additive modelling, and longitudinal transition modelling. As outlined in Chapter 2, many of these methods offer several advantages (modelling of non-linear relationships, probabilistic uncertainty, and complex temporal transitions) and extend beyond what may be traditionally used in psychological procrastination research.

Nevertheless, the complexity of procrastination in later life suggests that there remains considerable scope for further methodological development. As mentioned previously, many of the relationships examined within this thesis are likely to be dynamic, reciprocal, and interdependent rather than strictly unidirectional. Consequently, future research may benefit from using statistical approaches capable of simultaneously estimating multiple pathways and temporal dependencies. For instance, multivariate models (fitted under either the frequentist or Bayesian paradigms) would allow for the joint modelling of procrastination, depressive symptomatology, health behaviours, and cognitive functioning while explicitly accounting for any potential correlations between these outcomes. Similarly, dynamic structural equation models or cross-lagged panel models when applied to repeated measures of procrastination across time would allow for future researchers to disentangle the relationships between procrastination, affective functioning, and health over time.

8.6 Limitations

As with any body of work, several limitations should be considered when interpreting the findings of this thesis. Although each of the individual chapters have their own specific limitations (which have already been discussed), a number of broader methodological considerations apply for the thesis as a whole. Firstly, while meaningful associations were demonstrated between procrastination, depression, social norms, subjective remaining life, health behaviours, and cognitive functioning, the direction of these relationships cannot be determined. Indeed, several of the theoretical pathways proposed throughout this thesis are likely to be reciprocal. For example, procrastination may contribute to poorer health and cognitive outcomes, while declining health and cognitive functioning may themselves increase procrastinatory behaviour (Johansson et al., 2023). Additionally, while Chapter 7 did employ longitudinal data, the procrastination variable itself was measured only at a single time point, largely due to the nature of the HRS experimental modules. Consequently, it was not possible to examine within-person changes in procrastination or determine whether changes in procrastination precede, accompany, or follow changes in cognitive functioning.

A second overarching limitation concerns the extensive use of secondary data. Several chapters of this thesis (namely, Chapters 3, 6 and 7) utilised data from the HRS. While the HRS provides a rich and nationally representative data source for the study of ageing, it was not originally designed with procrastination as i.) a primary construct of interest and ii.) a repeatedly measured construct. Consequently, the scope of this thesis was limited by the variables available within the dataset, as well as both the nuances of those variables and the design of the HRS itself.

In addition, the use of the HRS data introduces several important contextual and generalisability limitations. The HRS is based entirely on a US population. As such,

the findings may not fully generalise to other national, healthcare, and cultural contexts. This is especially relevant for the findings of Chapters 6 and 7, where procrastination was examined in the context of preventive health care usage and cognitive ageing. The health care system in the US is quite different from many of the European systems, particularly with respect to accessibility, insurance, and financial costs (Marchildon, 2022). Such differences may influence not only the consequences of procrastination but also the reasons behind why one may procrastinate. For example, in health care systems where access is largely universal and financial barriers are relatively low, delaying a medical appointment may be more directly attributable to procrastinatory tendencies. However, in health care systems where access is more costly or difficult to attain, procrastination of such care may be partly due to such structural barriers rather than purely because of an individual's self-regulatory processes.

Overall, the constraints of the HRS had several implications for the analyses conducted throughout the thesis. First, certain important psychological constructs could not always be included into statistical models. For instance, stress was excluded from the generalised additive models used in Chapter 6 due to 71% of the data being missing, despite stress being a key component in the relationship between procrastination and health care utilisation (Sirois, 2007, 2023; Sirois et al., 2003, 2023). Similarly, alternative affective states (e.g., anxiety) could not be sufficiently examined in both Chapters 3 and 7 due to high levels of systematic missingness across the waves of data collection. Finally, and as mentioned before, data from the HRS are drawn from a US population, which limits the generalisability of findings to other national, healthcare, and cultural contexts. Nevertheless, the HRS made it possible to investigate procrastination within a large, nationally representative ageing cohort that would otherwise be difficult to gather through primary data collection alone.

Finally, the results of this thesis are mostly observational in nature. While a compelling theoretical and empirical case is made for the significance of procrastination in older adulthood, this thesis does not provide direct evidence that interventions targeting procrastination in older adults improve health behaviour engagement, reduce cognitive risk, or attenuate the affective consequences of procrastination. Prior research has shown procrastination to be responsive to intervention (Ferreira et al., 2025; Rozental et al., 2018; Van Eerde & Klingsieck, 2018) however, the majority of these interventions have been developed and evaluated using younger adult populations. Consequently, it remains unclear whether existing interventions approaches are appropriate for older adults.

8.7 Directions for future research

When considered together, the findings and limitations of this thesis open up a number of important and interesting avenues for future research.

To the best of the authors knowledge, the HRS is the only longitudinal cohort study that i.) collects data on older adults and ii.) has a measure of procrastination, albeit only a single wave measure of procrastination. However as noted in the above limitations section, the HRS has its own strengths and limitations. While the HRS made it possible to examine procrastination within a large scale, nationally representative ageing population, the absence of a repeated procrastination measure limited the ability to within-person changes in procrastination over time or disentangle the temporal ordering of many of the relationships observed throughout this thesis. As such, perhaps one of the most important priorities for future research is the development of longitudinal studies that repeatedly assess procrastination across later life. Throughout this thesis, procrastination was shown to be associated with depressive symptomatology, subjective remaining life, preventive health behaviours, and cognitive decline. However, due to the observational (and mostly cross-sectional) nature of these findings, the temporal ordering of these relationships could not be fully determined.

Longitudinal study designs with repeated measures of procrastination would enable researchers to examine within-person changes in procrastination, especially as individuals experience major life events such as retirement, bereavement, declining health, or simply very old age. In addition, such studies would enable direct testing of casual claims that could not be fully disentangled within this thesis. For instance, whether increases in depressive symptoms precede and cause increases in procrastination, or whether there is a bi-directional relationship between procrastination and health care utilisation in older adulthood, or whether procrastination predicts, accompanies, or follows cognitive decline.

One important thing to note is that this would not necessarily require the creation of new longitudinal cohort studies. In fact, a practical next step would be the incorporation of a brief, validated measure of procrastination, such as the short General Procrastination Scale (Sirois et al., 2019) into existing large scale longitudinal ageing datasets. Possible studies could include The Irish Longitudinal Study on Ageing (TILDA) or the English Longitudinal Study of Ageing (ELSA). While it would also be beneficial to recommend this for the HRS, the fact that the procrastination measure was included within an “experimental module” means that it wont ever be included in the HRS again, albeit unless an administrative change is made within the study itself. Overall, integrating a measure of procrastination into established studies such as these would provide an efficient means of examining the longitudinal development of procrastination in older adults across a range of diverse healthcare systems, cultural contexts, and ageing trajectories.

In addition, the observational findings established in this thesis require complementary experimental and intervention research. Several of the findings within this thesis suggest that procrastination may be associated with depressive symptomatology, reduced engagement in preventive health behaviours, and cognitive decline. Collectively, these findings suggest that procrastination may be a risk factor for health ageing. However, whether reducing procrastination would improve these outcomes is still an unanswered question.

Existing evidence suggests that procrastination is responsive to intervention (Ferreira et al., 2025; Rozentel et al., 2018; Van Eerde & Klingsieck, 2018). However, the majority of intervention studies have focused on younger adults, particularly university students, and typically revolve around academic performance or general self-regulation. Relatively little is known about whether these approaches would be equally effective in older adulthood. According to Van Eerde and Klingsieck (2018), procrastination is particularly responsive to cognitive behavioural therapy (CBT). However, such approaches may need to be modified for older adults to account for age-related physical and cognitive changes (Skosireva et al., 2025). Future research should therefore evaluate whether established interventions can be successfully adapted for older adult populations. In addition, health care systems may benefit from external changes, that reduce opportunities for delay. For instance, having default appointment scheduling, automated reminders, or more simplified booking procedures.

8.8 Applied and clinical implications

The findings of this thesis suggest that procrastination in later life may have implications extending beyond productivity and everyday self-regulation. Over multiple studies, procrastination was associated with emotional well-being, preventive health behaviours, and cognitive functioning. Overall, procrastination may represent an important determinant in healthy ageing. As such, the findings of this thesis collectively point toward several practical implications for clinicians, public health practitioners, and policy-makers working with older populations.

One of these implications is that procrastination may warrant greater attention during routine health and wellbeing assessments. The findings of this thesis suggest that procrastination may be associated with depressive symptomatology, reduced engagement in preventive health behaviours, and may be considered a marker of cognitive decline. Incorporating brief measures of procrastination into health and wellbeing assessments may help identify individuals who are at increased risk of delaying important health related actions. Given the prior mediating role of depression noted in Chapter 3, this would be particularly useful if late life depression was also being screened for at the same time. A simple procrastination screening tool, such as the shortened General Procrastination Scale (Sirois et al., 2019), could help

identify older adults at risk of both health behaviour avoidance and potential early cognitive impairment. Such older adults could be given additional support, monitoring, or intervention.

A second implication concerns the design of environments in which older adults make important health and life decisions. As mentioned in Chapter 1, procrastination in later life may arise from a mismatch between the external environment (healthcare portals, financial platforms, appointment scheduling systems) and an older individual's current competencies and self-regulatory resources (Becker, 2004; Thomas et al., 2023). The results from Chapter 6 suggested that the association between procrastination and preventive health care usage may be because of the structural complexity of health behaviours, echoing this proposition. Consequently, making some simplified structural and environmental changes may help in reducing the procrastination driven avoidance. One such notable change could include default appointment scheduling. Rather than requiring an individual to proactively decide when to book an appointment for a preventive health check-up, practitioners could schedule the appointment automatically and inform the individual as of the date (with the option to cancel or reschedule if necessary). In fact, prior research has shown such practice to increase uptake in influenza vaccinations (Chapman et al., 2016). Other changes could include more accessible digital systems or proactive health practitioner outreach would likely help in reducing the procrastination-driven avoidance. Perhaps the most important aspect of this would be that such changes wouldn't require individuals to change their dispositional tendencies. Rather, these changes would seek to modify the environment in ways that make desired behaviours easier to initiate and maintain.

Finally, a larger implication would be to reframe procrastination in later life as more than just a "bad habit", but rather as a marker of healthy ageing. Reframing procrastination in this way has the advantage of shifting the explanation of procrastination away from individualised explanations toward a more integrated biopsychosocial explanation. One that could incorporate both not only person level, but also and contextual influences.

8.9 When time matters most

Procrastination has traditionally been studied as though time were an abundant resource. A resource to be managed, optimised, and occasionally wasted without any real lasting consequence. For a younger adult, this is oftentimes true. A missed deadline or a delayed decision can usually be revisited, repaired, or simply forgotten. However, this thesis suggests that later life does not afford the same margin of error. A postponed mammogram, an unmade will, or a delayed conversation about care are not simply inconvenient. They are decisions made against a backdrop of genuinely diminishing time, where the capacity to recover from delay, be it physically, financially, and cognitively, is itself in decline. While procrastination, on the surface, may look like the same across the lifespan; underneath, it is a fundamentally different wager.

Simply put, it is this shift in stakes that makes procrastination in older adulthood an urgent concern rather than a curious one. The mechanisms uncovered across this thesis, depressive symptomatology, social evaluation, temporal orientation, health disengagement, and cognitive decline, are not unique to old age. A younger adult may experience all these things too. However, what is unique is how little room later life leaves before these decisions harden into irreversible outcomes. As the global population continues to age, this margin will matter to a growing number of people and the oftentimes invisible act of putting something off may increasingly determine whether that time is spent well or lost. Recognising when time matters most, and building the psychological, social, and environmental supports that help people act while it still does, may be one of the most consequential, and most overlooked, challenges of supporting healthy ageing.

