1   Abstract

2   Reporting a high level of meaning in one's life has been found to impact an individual's

3   wellbeing and mental health in a positive way. However, the majority of meaning-

4   orientated interventions have been developed to help individuals cope with adversity, while

5   limited interventions have focused on promoting, flourishing, and preventing mental

6   illnesses in the general population. This research aimed to develop and test an online

7   meaning in life intervention aimed at the general population. Based on a theoretical

8   framework of meaning in life and empirically validated approaches, a convenience sample

9   of Icelandic adults (N = 177) participated in a Randomised Control Trial (RCT) and were

10   assigned to one of two interventions or an active control group. The hypothesis stated that *a*

11   *Motivational Meaning Intervention* and *Cognitive Motivational Meaning Intervention*

12   would result in greater perceptions of self-reported *Meaning in Life, Subjective Wellbeing*,

13   *Psychological Wellbeing* and *Positive Affect* compared to a control condition. The results

14   showed that both interventions enhanced *positive affect* while *neither intervention*

15   increased *meaning in life*, *subjective wellbeing* nor *psychological wellbeing*. The

16   interventions appear to be inexpensive, easily administered, and effective in increasing

17   positive affect which is a major contributor to an individual's wellbeing. The study offers

18   meaningful conclusions and future avenues to enhance intervention studies to develop

19   essential elements of wellbeing and human functioning within general populations.

20   *Keywords:* Meaning in life, positive affect, intervention, goal-setting, life story review

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25 **A meaning in life intervention: Setting personal goals and reviewing life story increases**
26   **positive affect**

27   Meaning in life (MIL) is considered a key component of psychological wellbeing

28 (PWB; Ryff, 1989), a form of positive psychological functioning that includes living well,

29 responsibly and successfully. Studies have demonstrated that experiencing MIL is a major

30 contributor to people's wellbeing (Steger et al., 2009) both as a protective factor (Brassai et

31 al., 2011) and as a resource of adaptive coping (Thompson et al., 2003).

32   Martela and Steger (2016) defined MIL mainly by three facets: coherence, purpose

33 and significance while also noting other potential avenues warrant further explorations such

34 as an affective component (Reker & Wong, 1988, 2012), a behavioural component and

35 existential meaning (Wong, 2010). Coherence, often referred to as the cognitive component

36 of MIL, refers to comprehending and making sense of our experiences, ourselves and the

37 world around us (Heintzelman & King, 2014). Purpose, also considered the motivational

38 component, means having an aspiring direction and aim in life (George & Park, 2013).

39 Significance, which refers to the evaluative component of MIL, is perceiving that life is

40 valuable and worth living (Martela & Steger, 2016). Martela & Steger (2016) argue that the

41 three facets relate to different dimensions of human experience, and therefore future studies

42 would benefit from studying these facets separately. Experiencing a high level of MIL is

43 widely considered to be crucial to our wellbeing. Higher levels of MIL have been positively

44 associated with psychological wellbeing across the human lifespan from adolescence to

45 older adulthood (Steger et al., 2009; Zika & Chamberlain, 1992). High meaning in life is

46 also associated with higher life satisfaction (Steger & Kashdan, 2007), longevity (Hill &

47 Turiano, 2014), happiness (Steger et al., 2009), health (Steger et al., 2009) and positive

48 affect (PA), the experience of positive feelings in one's life (Diener et al., 1985; Hicks &

49 King, 2009; Watson et al., 1988). Poor MIL is related to addiction problems (Nicholson et

50   al., 1994), increased risk of suicide attempts over a lifetime (Kleiman & Beaver, 2013),

51   negative affect (Zika & Chamberlain, 1992) and mental health disorders such as anxiety

52   (Debats et al., 1993) and depression (Steger & Kashdan, 2009). While acknowledging the

53   limitations of correlational design which the majority of studies in the field of MIL use, the

54   cumulation of studies suggests that MIL may be a major contributor to our wellbeing.

55   Therefore, promoting interventions that focus on increasing MIL could potentially promote

56   flourishing and psychological wellbeing. Moreover, these interventions could help

57   individuals cope with and potentially prevent mental health challenges.

58   Despite the importance of MIL to an individual's wellbeing, studies on how to

59   promote MIL are limited (Shin & Steger, 2014). The majority of meaning-orientated

60   interventions have been developed to help individuals cope with difficulties by finding

61   meaning in their trauma and illnesses (Breitbart et al., 2010; Guerrero-Torrelles et al, 2017;

62   Henry et al., 2010; Rodin et al, 2018, Saeedi et al, 2019; Wong, 2010) or psychological

63   difficulties among the clinical population (Guo et al, 2013; Lan et al, 2018; Lee et al., 2006;

64   Wright et al., 2007). Although finding meaning in difficult experiences is important in order

65   to restore wellbeing (Park & Folkman, 1997), studies that test empirically validated ways to

66   increase MIL outside the clinical population are lacking (Shin & Steger, 2014). Wong

67   (2010) illustrated that comprehensive meaning-orientated interventions are applicable to

68   promote flourishing within the general population; however, only a few intervention studies

69   have focused solely on enhancing MIL to promote flourishing and prevent mental illnesses

70   within the general population (Costin & Vignoles, 2020; Howell, Passmore & Holder,

71   2016; Klein, 2017; Littman-Ovadia & Steger, 2010; Magee, 1998).

72   Several studies have assessed the effectiveness of an intervention on MIL. Within the

73   general population, studies demonstrated that prosocial behaviour (Klein, 2017), strength

74   endorsement (Littman-Ovadia & Steger, 2010), photography intervention (Steger et al,

75   2014; 2013) and induced positive affect (King et al., 2006) increased MIL. Among the

76   clinical population, psychotherapy, mindfulness- and narrative program (Manco & Hamby,

77   2021), psychological meaning-centred therapy and logotherapy (Vos & Vitali, 2018)

78   enhanced MIL.

79   Shin & Steger (2014) proposed that an ideal MIL intervention could be composed of

80   exercises that target both the cognitive and the motivational components of MIL, however,

81   a recent study by Costin & Vignoles (2020) showed that the evaluative component,

82   significance, defined as a sense of mattering, was a significant precursor of experiencing

83   MIL where purpose and coherence did not. Although Costin & Vingoles suggested that

84   research should attend more to a sense of mattering, studies have also argued that as a result

85   of targeting the cognitive and motivational components, individuals obtain greater

86   coherence and purpose which strengthens the evaluative component of MIL. Significance is

87   perceived when individuals pursue worthwhile goals and have a sense of comprehension in

88   their lives (George & Park, 2013; Martela & Steger, 2016; Reker & Wong, 1988, 2012).

89   The aim of this study was to focus on intervention on MIL cognitive- and motivational

90   components. Regarding the intervention to target the cognitive component of the MIL, the

91   literature argues that fostering life narratives (McAdams, 1993) assists individuals in

92   gaining greater self-knowledge and personal meaning in life. Similar techniques which aim

93   to facilitate deeper self-understanding and personal meaning can be seen elsewhere such as

94   in narrative therapy (White, 2007), guided autobiography (Birren & Birren, 1996) and

95   guided reminiscence (Wong & Watt, 1999). One way of developing a life narrative is

96   through the construction of life stories (McAdams et al., 2006). A life story in this context,

97   and for the purpose of this study, is an articulated narrative of one's self that integrates and

98   reconstructs previous experiences into future or present life contexts (McAdams, 1993).

99   Articulating one's life story increases coherence as they shape how oneself, other

100   individuals, events, and actions can be experienced as meaningful (Stelter, 2009). By

101   construing a life story individuals obtain knowledge of who they are and how they became

102   that person (Bruner, 1990). Furthermore, they construe how events and other persons have

103   influenced their identity and learning in life (Erikson, 1968). Life story coherence has

104   shown to be statistically positively related to psychological wellbeing (Baerger &

105   McAdams, 1999). To target the cognitive component based on the MIL framework, the

106   present study asked individuals to write their life stories where they reflect on prior

107   experiences and events in their lives (McAdams, 2008). In relation to the intervention for

108   the motivational component of MIL, it has been suggested by various authors that people

109   may cultivate a sense of purpose by discerning, setting and engaging in personal,

110   meaningful goals (Emmons, 1999; Sheldon et al., 2002; Ryff & Singer, 1998). Goals are

111   considered to serve as an important element of purpose since they orient individuals towards

112   a meaningful path (Reker & Wong 1988). The role of goals in promoting wellbeing has been

113   well demonstrated (Brunstein, 1993; McKnight & Kashdan, 2009). Having personal goals

114   gives order and structure to people's lives (Emmons, 1986) and contributes to self-discovery

115   and psychological need satisfaction (Sheldon & Elliot, 1999; Sheldon & Kasser, 1998).

116   Meaningful goals enhance psychological wellbeing, positive affect, self-efficacy and life

117   satisfaction as well as undermine the effects of frustration, disappointment and anxiety

118   (Brunstein, 1993; Emmons & Diener, 1986; Emmons, 1986; Morisano et al., 2010). Having

119   goals will not necessarily contribute to a sense of purpose except for self-concordant goals

120   which are goals that are integrated into one's interest and authentic self (Sheldon & Elliot,

121   1999). Consequently, to target the motivational component, participants set personal goals

122   and reflected on them in a structured manner and considered their motives behind them

123   (Morisano et al., 2010; Sheldon et al., 2002). Participants were encouraged to think about

124   goals that connect to sources which people derive meaning from in their lives such as social

125   life, leisure activity, family life, school, career and health (Wong, 2012).

126   The purpose of the current study was to investigate whether it is possible to develop an

127   effective empirically validated MIL intervention. To address the research question, the

128   study will assess whether a Cognitive Motivational Meaning Intervention (CMMI) which

129   combines the interventions of the cognitive and the motivational component of MIL will

130   result in greater MIL, PWB, PA and Subjective wellbeing (SWB) defined as cognitive

131   judgement of happiness, compared to a control group. As it has been indicated necessary

132   for future MIL studies to investigate whether dissimilar components of MIL will influence

133   different psychological outcomes (Martela & Steger, 2016), the study will also assess

134   whether the CMMI will increase all variables more than a Motivational Meaning

135   Intervention (MMI) which solely consist of the intervention of the motivational component

136   of MIL. Based on the MIL framework and prior studies (Baerger & McAdams, 1999;

137   Brunstein, 1993; Martela & Steger, 2016; McKnight & Kashdan, 2009; King et al., 2006) it

138   is hypothesized that the interventions will enhance MIL, PWB, SWB and PA compared to a

139   control condition. The secondary hypothesis of the study is that the CMMI will enhance all

140   variables to a greater extent than MMI.

141   **Method**
142   **Participants**
143
144   A convenience sample of participants was recruited through the researcher's personal

145   Instagram and Facebook platforms which are known for psychology, wellbeing and health.

146   Individuals were encouraged to participate with information regarding the research through

147   Facebook posts and Instagram stories along with an anonymous link to an online survey system

148   (Qualtrics). To increase awareness of the study, the researcher asked friends, family members

149   and his social media followers to share the posts. A poll was created in Instagram stories that

150   asked whether individuals were interested in participating in the research. All individuals who

151   were interested were sent a message which contained a detailed description of the study. The

152   sample population were Icelandic individuals within the age range of eighteen to thirty-five.

153   Participation was completely voluntary, and no type of reward was offered.

154   All participants who completed the study answered the questionnaires and fulfilled the

155   criteria of the interventions were included in the sample. Of the 185 participants, eight were

156   excluded from the study due to missing data. Those participants went through the whole study

157   without answering any questionnaires nor writing anything in the intervention section.

158   Participants who failed to complete several questions or participate in the interventions to a full

159   extent were included in the sample.

160   Of the 177 participants who were included, 44 (24.9%) identified as male and 133

161   (75.1%) as female. The mean age was 24.28 years (SD=4.94). Participants were randomly

162   assigned to one of three conditions: A Cognitive Motivational Meaning intervention (n=42), a

163   Motivational Meaning intervention (n=65) and a control condition (n=70). All participants read

164   an information letter and gave informed consent before participation.

165   **Materials**

166   Questionnaires were distributed using Qualtrics, an online survey system.

167   Demographic data were obtained with self-reported answers about participants' age and

168   gender followed by questionnaires about meaning in life, psychological wellbeing, subjective

169   wellbeing, positive affect and negative affect. All versions of the questions and

170   questionnaires which were utilized in the study were considered to be the optimal means to

171   achieve the purpose of the study among the Icelandic population. It was emphasized by the

172   researcher and the supervisors to use translated scales which have demonstrated good

173   psychometric properties in Iceland. All of the scales and the chosen items except the

174   Flourishing Scale (Diener et al., 2010) have been frequently used in Icelandic studies

175   (Embætti Landlæknis, 2017).

176   *Meaning in Life* was measured with three items from the Meaning in Life

177   Questionnaire (MLQ; Steger, Frazier, Oishi, & Kaler, 2006). The items measure the

178   presence of MIL with questions such as "*My life has a clear sense of purpose*". Items were

179   rated on a four-point Likert scale from 1 (*absolutely untrue*) to 4 (*absolutely true*). The total

180   score could range from 3 to 12 and a higher total score reflected a higher presence of MIL.

181   The questionnaire was translated into Icelandic by Embætti landlæknis (2017) and has been

182   used to assess the mental health of the Icelandic population since 2007. MLQ has shown

183   robust psychometric properties (Steger et al., 2006) and the Cronbach's alpha in the present

184   study indicated good internal consistency pre ($\alpha = .839$) and post interventions ($\alpha = .870$).

185   *Psychological wellbeing* was assessed by the Flourishing Scale (FS; Diener et al.,

186   2010) translated into Icelandic by the researcher of the study with the assistance of a

187   professional translator, Þórhildur Lárusdóttir. FS is a brief 8-item instrument with

188   statements such as "*I am engaged and interested* in *my daily activities*" which provide a

189   single psychological wellbeing score. Items were measured with a 7-point Likert scale from

190   1 (*Strongly disagree*) to 7 (*Strongly agree*). A higher combined score indicated greater

191   psychological wellbeing. The FS has demonstrated good psychometric properties (Diener et

192   al., 2010) and in this study, Cronbach's alpha showed good internal consistency ($\alpha = .861$)

193   prior to and excellent ($\alpha = .922$) post assigned conditions.

194   *Subjective wellbeing* was evaluated with a single item that asks: "*On the whole, how*

195   *happy do you consider yourself to be*?". The question was scored on a 10-point Likert scale

196   from 1 (*very unhappy*) to 10 (*very happy*) and a higher score reflected greater subjective

197   wellbeing. This single item has been used to assess subjective wellbeing among Icelanders

198   since 2007 (Embætti Landlæknis, 2017). Studies have demonstrated that measuring SWB

199   with a single item is valid and reliable in surveys and cross-cultural comparisons (Abdel-

200   Khalek, 2006) and perform very similar when compared to multiple item measurements on

201   the same construct (Cheung & Lucas, 2014). Single item SWB measure has shown good

202   concurrent and convergent validity (Abdel-Khalek, 2006).

203   *Positive and Negative Affect* was measured with the Positive and Negative affect

204   Schedule (PANAS; Watson et al., 1988) which was translated into Icelandic by Ragna B.

205   Garðarsdóttir. PANAS measures mood with two 10-item scales which include adjectives

206   that describe various feelings and emotions. One scale measures Positive Affect (PA) with

207   items such as *Enthusiastic, Determined* and *Proud* while the other scale assesses Negative

208   Affect (NA) with items like *Hostile, Scared* and *Upset*. A 5-point Likert scale from 1 (*Very*

209   *Slightly or Not at all)* to 10 (*Extremely*) was used to evaluate how participants felt at the

210   present moment. PA and NA total scores are combined respectively and a higher summary

211   score reflected higher PA or NA. PANAS has demonstrated robust psychometric properties

212   (Watson et al., 1988) and the Cronbach's alpha in this study indicated good internal

213   consistency for NA (α = .899) and PA (α =.827) prior to the interventions and excellent for

214   NA (α= .936) and good for PA (α = .860) post interventions.

215   **Procedure**

216   This study used a 3x2 mixed factorial design to compare scores between three

217   conditions before and after interventions. The independent variable was a between-subject

218   variable that contained three conditions: Cognitive Motivational Meaning Intervention

219   (CMMI), Motivational Meaning Intervention (MMI) and an active control condition. The

220   within dependent variables were MIL, PWB, SWB and PA scores pre and post interventions.

221   Participation was briefly described in a Facebook post and through Instagram stories.

222   Participants were informed that to engage in the study they had to be eighteen to thirty-five

223   years old, have an access to a computer and devote thirty to sixty minutes in a quiet setting

224   with minimal interruption. A link to the study was presented in the information. All study

225   components were completed through an online Qualtrics survey system.

226   Participants were presented with an information letter after clicking the link which

227   contained necessary information such as confidentiality, procedure and deceived purpose of

228   the study. Participants could not be informed of the true purpose of the study as it could have

229   affected the results. They were told that they would answer four questionnaires, then engage

230   in a few writing exercises and subsequently answer four questionnaires. Before answering

231   questions about demographics (age and gender) participants gave informed consent by

232   clicking on the buttons below four statements only if they agreed with them. Three times

233   throughout the study, participants were encouraged to stop if they experienced overwhelming

234   emotions and thoughts while writing and to do something which they enjoyed such as going

235   for a walk, meeting a friend or listening to music. If they felt in need of support they were

236   encouraged to call a friend/family member or reach out to relevant help associations in

237   Iceland.

238   The first task was to answer a series of questionnaires described in detail in the

239   material section above. Participants were then randomly assigned to three conditions: CMMI,

240   MMI or an active control condition. Participants in the intervention conditions were informed

241   that (a) what they wrote was completely confidential; (b) that they should write in as much

242   detail as possible regardless of spelling mistakes or grammatical errors and (c) they should

243   include their deepest thoughts and emotions in their writing.

244   **Cognitive Motivational Meaning Intervention.** In the CMMI participants were first

245   instructed to write their life story, an adapted version of the life story review (McAdams,

246   2008). They were asked to imagine that they were writing their life story for an individual

247   that would like to know more about them and the things that had occurred in their lives. They

248   were informed that their story did not have to include their whole life only the most important

249   parts and that what they wrote was completely up to them. To encourage their writing, they

250   were invited to reflect on key events (positive moments, adversity or a turning point) which

251   had influenced their lives. In addition, they were presented with a series of questions that they

252   could rely on to support their writing such as what are the most influential memories in your

253   life and why, what is an event or a person that has most influenced you in life, what role is

254   the most important in your life, what moment in life are you most proud of and what is the

255   most important thing in your life and why.

256   **Motivational Meaning Intervention.** In the second part of the CMMI participants

257   engaged in the MMI which was adapted from the goal-setting program (Morisano et al.,

258   2010). The intervention facilitated participants to identify personal goals and develop detailed

259   strategies to achieve them. Through the following steps they were instructed to (a) develop a

260   vision for the future by imagining and writing about their ideal future for fifteen minutes; (b)

261   distinguish their ideal future into four goals and identify when they would like to achieve

262   them; (c) and evaluate the motives and develop strategies to achieve each goal. They were

263   informed that their ideal future and goals could relate to social life (family and friends),

264   professional life (work/school) or personal life (leisure and health). In each step, participants

265   were supported by a series of questions that encouraged self-reflection and self-concordant

266   goal setting. The key difference between the experimental conditions was that CMMI

267   included both interventions while the MMI only consisted of the MMI intervention.

268   **Control condition.** An active control group was utilized as a baseline for the

269   experimental conditions of the study. The control group participated in two tasks. The

270   purpose of these tasks was to match the writing aspects of the CMMI and MMI. The first

271   task was to imagine and write about the last twenty-four hours in their lives for fifteen

272   minutes. The second task was to reflect on the two aforementioned activities in greater

273   detail for ten minutes. All participants were instructed to write constantly regardless of

274   spelling mistakes or grammatical errors. They were asked to write in a detailed, serious and

275   objective manner with minimal emotional expression.

276   All participants answered the same questionnaires subsequent to engaging in the

277   writing assignments. Finally, they were presented with a debrief letter containing detailed

278   information about the true purpose of the study. All participants were appreciated for their

279   participation.

280   The data from the Qualtrics survey was converted into IBM SPSS software version

281   24. Numeric values were used to represent the missing data, items were coded into the

282   aforementioned variables of the study, assumptions were assessed and relevant statistical

283   tests were administrated in SPSS.

284   **Data analysis**

285   All analysis of the study was conducted in SPSS. Scale reliability was evaluated with

286   Cronbach's alpha coefficients. To assess the main hypothesis of the study, five separate

287   statistical tests of two-way mixed-design ANOVA were used to compare MIL, PWB, SWB,

288   PA and NA scores between the conditions at baseline and postintervention.

289   The assumption of normality was violated for all conditions in a vast majority of

290   measures, assessed visually with boxplots and Q-Q plots, skewness, kurtosis and calculated

291   z-scores and with Kolmogorov-Smirnov tests. Nevertheless, the test was utilized as ANOVA

292   is considered robust to data that is not normally distributed (Field, 2013). The assumption of

293   homogeneity of variances and covariances was met for all analyses.

294   Seven significant outliers were found by looking at studentized residuals (SRE) that

295   were greater than ±3. They did not affect the results assessed by conducting a two-way

296   ANOVA with and without outliers (Field, 2013). When assessing MIL two outliers with an

297   SRE value of -3.52 were removed to meet the assumption of homogeneity of variances. Data

298   transformation did not correct non-normality.

299

<p style="text-align:center">**Results**</p>

301

Baseline measures

303

304   Measures pre intervention were conducted to assess whether conditions differed at

305   baseline. No significant difference was found in gender $\chi(2) = 1.13$, p = .57. and age

306   (F(2,153) = 1.29, p = .28 when comparing participants in the CMMI condition ($n = 42$), MMI

307   condition ($n = 65$) and Control condition ($n = 70$). There were no significant baseline

308   differences between CMMI, MMI and the control condition in PWB (F(2,174) = .27, p = .76 ,

309   SWB (F(2,174) = .23, p = .80, MIL (F(2,174) = .23 p = .48, PA (F(2,174) = .73, p = .48 and

310   NA (F(2,174) = .26, p = .78 (see table 1 for means and standard deviations of each

311   condition).

312   Table 1

314   *Dependent Variable Measures at Baseline*

315

	CMMI		MMI		Control		
	M	SD	M	SD	M	SD	p
Psychological wellbeing	47.26	5.84	46.63	6.88	47.37	5.49	.76
Subjective wellbeing	7.57	1.29	7.46	1.36	7.60	1.46	.23
Meaning in life	9.38	1.79	9.02	2.43	9.43	1.96	.48
Positive affect	32.93	5.29	32.94	6.24	32.89	6.12	.73
Negative affect	17.86	6.24	18.09	7.05	17.30	6.35	.78

316

MIL, PWB, SWB and NA

318

There was a non-significant interaction between the intervention and time on MIL F(2, 167)

= 1.46, p = .24, r = .09, PWB F(2, 174) = .28, p = .76, r = .07, SWB F(2, 174) = .88, p = .42,

321   r = .07 and NA $F(2,172) = .048$, p = .95, r = .02 (see table 2 for means and standard

322   deviations of the dependent variables postintervention).There was a significant main effect of

323   time on MIL $F(2,167) = 45.09$, p <.001, r = .63, SWB $F(2,174) = 42.49$, p < .001, r = .36 and

324   NA $F(2,172) = 56.19$, p < .001, r = .5

325   **PA**

326   There was a significant interaction between interventions and time on PA $F(2, 172) =$

327   9.21, p < .001, r = .23. To break down the interaction, two separate between subject ANOVA

328   was used to assess the difference in PA between conditions at baseline and postintervention.

329   There was a significant difference in PA between the conditions post intervention, $F(2,172) =$

330   3.34, p = .038, ω = .16. (see figure 1 for comparison of PA changes between the condition

331   from baseline to postintervention). PA was significantly greater in the CMMI condition and

332   MMI condition compared to the control condition (see table 2). PA was not significantly

333   higher in the CMMI condition compared to the MMI condition.

334   **Figure 1**

335   *Condition Differences in PA from Baseline to Postintervention*

336
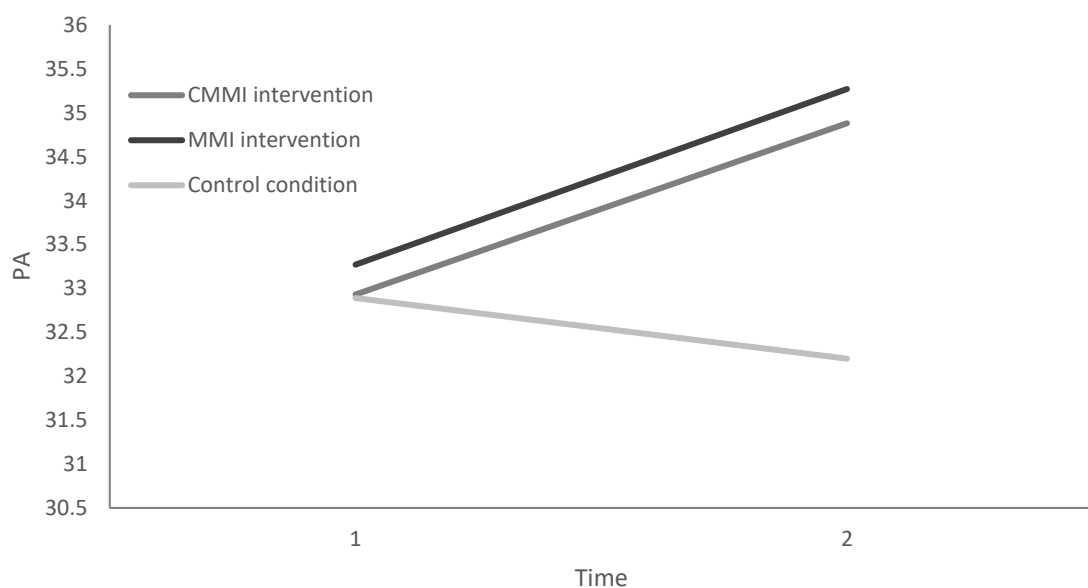
337

338   **Post-hoc analysis**

339

340   One post-hoc analysis was executed as there is a robust relationship between PA and

341   MIL (King et al., 2006). A simple linear regression was conducted to assess whether MIL

342   was predicted by PA. A visual inspection of linearity in a scatterplot indicated a linear

343   relationship between the two variables. There was normality of residuals and

344   homoscedasticity. One outlier was found with a MIL score of 3. This participant was

345   included in the analysis as he did not significantly affect the results. PA significantly

346   predicted MIL $F(1,173) = 39.24$, $p < 0.001$ and accounted for 18.5% of the explained

347   variability in MIL with adjusted $R^2 = 18\%$ (see figure 2). The regression equation was:

348   predicted MIL = 5.64 + (.13 X PA). A higher PA score of one leads to a .13 increase in the

349   experience of MIL.

350   **Figure 2**
351
352   *The Relationship Between PA and MIL*
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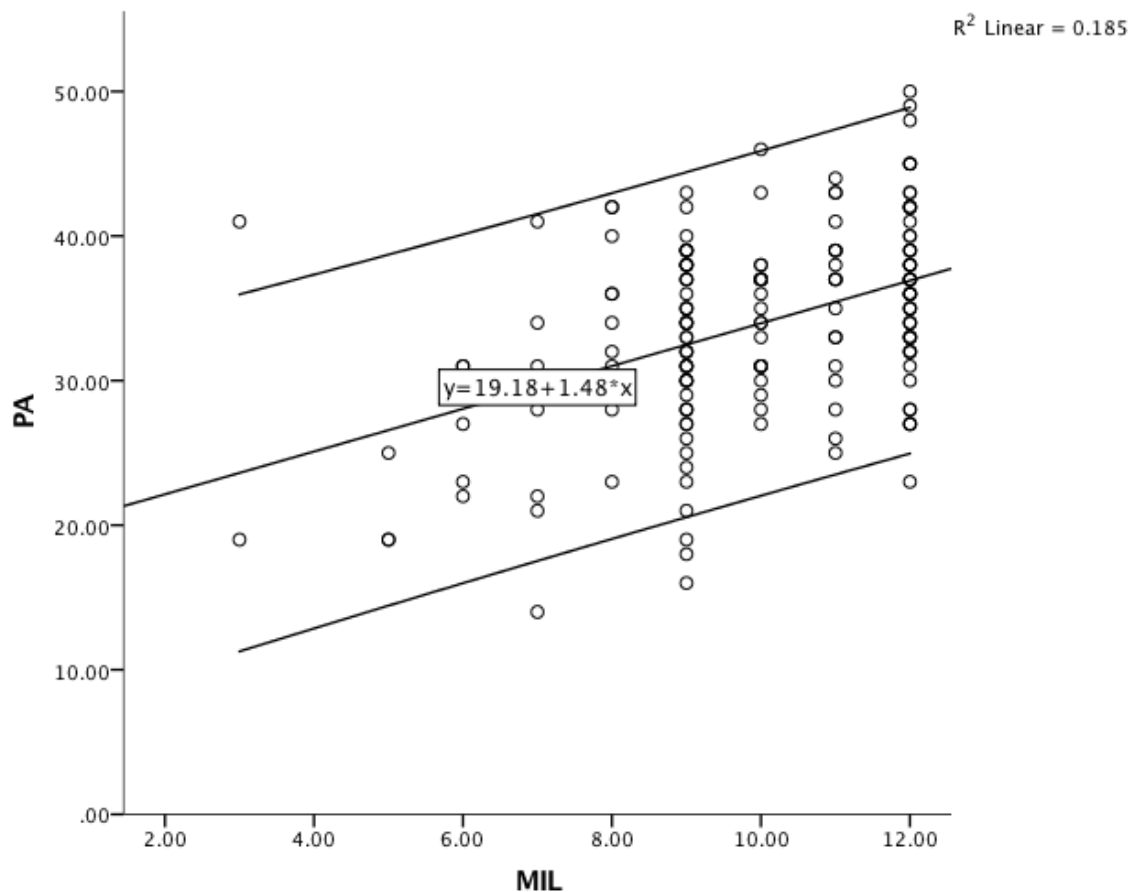
354

355   **Discussion**
356
357   The purpose of the study was to investigate whether it is possible to develop a brief

358   empirically validated MIL intervention and assess whether it would increase MIL, PWB,

359   SWB and PA. The results demonstrated that participants who engaged in goal-setting and a

360   life story review did not experience significantly greater MIL, PWB and SWB compared to

361   a control group. However, participants in both of the intervention conditions experienced

362   higher PA postintervention than the active control group.

363   The most relevant finding of the present study was that the interventions did not

364   increase reported MIL while they significantly increase PA compared to the control

365   condition. These findings suggest that a brief intervention which includes setting personal

366   goals and reviewing a life story does not appear to facilitate the experience of MIL within the

367   present sample. In one way, the findings do not support the main hypothesis of the study and

368   suggest that a brief intervention which promotes MIL components is not effective in

369   enhancing MIL. As far as the authors are aware, no randomized control trial study has

370   assessed MIL with interventions that target the MIL components directly. The findings of the

371   present study diverge from previous suggestions that a life story review assists individuals to

372   increase personal meaning in life (Baerger & McAdams, 1999; Birren & Birren, 1996;

373   McAdams, 1993; White, 2007; Wong & Watt, 1999) and studies that show that narrative

374   programs (Manco & Hamby, 2021) and meaning-centred therapies (Vos & Vitali, 2018)

375   enhance MIL. Furthermore, the findings from this study contradict previous findings

376   suggesting that setting goals enhances PWB, and SWB and provide a sense of purpose

377   (Brunstein, 1993; Emmons, 1986; Emmons, 1999).

378   On the other hand, the results of the study partially support the main hypotheses as

379   they demonstrate that reviewing life stories and setting personal goals enhances PA compared

380   to a control condition. Carver and Schier (1990, 1998) suggest that negative and positive

381   moods provide people with feedback about their progress towards goals. Self-rated important

382   goals have shown to be as strongly related to PA as actually attaining them (Emmons &

383   Diener, 1986). From this point of view, setting and reflecting on personal goals may have

384   provided participants with the information that they are making a satisfactory process

385   towards goals that they value and consequently experience increased PA.

386   One potential reason for why the interventions increased PA, yet not the other

387   outcome measures of the study, could be that PA was measured as a state while the MIL,

388   PWB and SWB were measured as a trait. Trait scales scores pre and post an arousing or

389   relaxing intervention tend to be less malleable while state scales scores are more sensitive to

390   an external stimulus such as interventions if they are relevant to the state which is being

391   measured (Zuckerman, 1983). Furthermore, variability in mood has been shown to be much

392   greater than variability in global SWB judgements (Eid & Diener, 2004). Thus, it may be

393   unrealistic to report a significant change in MIL PWB, and SWB scores in thirty to eighty

394   minutes with brief interventions. The result from this study indicate that the interventions are

395   successful in influencing short-term state wellbeing. Whether the interventions affect long-

396   term trait and state wellbeing remains an unanswered question for future studies as one of the

397   limitations of the present study is it did not assess the long-term effects of the interventions.

398   To the best of the authors' knowledge, no similar MIL interventions have been conducted

399   longitudinally. Therefore, the results might also suggest that MIL is not meant to be

400   facilitated quickly and requires time to develop, which could partially explain why the longer

401   programmes such as psychotherapy, mindfulness- and narrative programs (Manco & Hamby,

402   2021), logotherapy and psychological meaning-centred therapies (Vos & Vitali, 2018) better

403   facilitate MIL. Thus, potential avenue for future studies to span the content of the

404   interventions over a greater period of time and potentially add more focused and in-depth

405   exercises to the interventions which would allow longer contemplation among participants.

406   The present study answers the research question partly, however, not completely. It

407   could be argued that the interventions of this study do not provide ample support to indicate

408   that it is possible to develop an empirically validated MIL intervention since they do not

409   influence MIL directly. A potential explanation for why the interventions do not directly

410   impact MIL could be that life seems to be pretty meaningful in general. Heintzelman & King

411   (2014) derived data from numerous studies based on representative samples which suggested

412   that MIL is relatively high in general. The self-reported MIL mean of the present study was

413   9.27 which is relatively high as the highest achievable score on the scale was 12. One

414   potential reason for the high reported MIL may be that MIL is a desired condition and thus

415   possibly influenced by desirability biases (Paulhus & Reid, 1991). Also, individuals often

416   adopt an overly positive view of themselves and their lives (Alicke & Sedikides, 2009). Thus,

417   participants may have responded in a manner that did not reflect their true reality.

418   On the other hand, the interventions were successful in enhancing PA which has

419   shown to have a robust relationship with MIL (King et al., 2006). The post-hoc analysis of

420   the current study demonstrated that PA statistically predicted MIL with a medium effect size

421   (Cohen, 1988). Although it is unknown what part the interventions contributed to the

422   relationship, PA and MIL appear to be related. Enhanced PA has shown to increase MIL

423   elsewhere (King et al., 2006) and studies have demonstrated that mood is often used as

424   information when assessing whether life is meaningful (King et al., 2006; Schwarz & Clore,

425   1983). PA could therefore play a critical role in the evaluative component of MIL (Martela &

426   Steger, 2016). Consequently, it could be argued that the interventions might work as a

427   precursor for MIL and that the study provides promising information about the possibility to

428   develop an empirically validated MIL intervention.

429   Since there was no difference between the CMMI and the MMI conditions in all

430   measures of the study, the role of writing one's life story is more ambiguous than the goal-

431   setting. Previous research has shown that writing about life goals significantly enhances

432   wellbeing and is less upsetting than writing about trauma (King, 2001). Writing about trauma

433   has shown to have good long-term advantages to wellbeing and health (Pennebaker, 1997),

434   however, recollecting upsetting experiences may produce distress in the short term. In

435   addition, how and to what extent people make sense of their experience is a strong predictor

436   of PWB (Alea, 2018). Interpreting a difficult event as having a positive outcome is related to

437   greater PWB while construing experiences that have gone from good to bad predicts low

438   levels of wellbeing (McAdams et al., 2001). Language coherence is also related to improved

439   health and PWB when writing about past experiences (Baerger & McAdams, 1999). Thus,

440   whether participants wrote about positive or difficult experiences, found a redemptive

441   element or not in their life stories and to what extent they comprehended their experiences

442   may have influenced their answers post-intervention. The result of the present study suggests

443   that writing about one's life story has no further benefit than solely engaging in goal setting,

444   at least in the present population. The secondary hypothesis was therefore not supported.

445   **Limitations**

446   The limitations of the present study should be considered. The first limitation

447   concerns the generalizability of the results. Participants were self-selected through a link on

448   the researcher's social media platforms. Only people who saw the link participated in the

449   research and people who were interested were more likely to participate in the study.

450   Participants were also especially prone to be motivated towards self-improvement as the

451   social media platforms of the researcher are known for psychology, wellbeing and health.

452   Therefore, they potentially expected to benefit and experience a change in their wellbeing as

453   a result of participating in the research.

454   Further limitations lie in the potential biases of self-reporting as the analysis was

455   entirely based on self-reports. No questionnaire is truly a phenomenon in itself (Schwartz,

456   1999). There was an imbalance of gender distribution as 75.1% (133) of participants were

457   female. Also, since it was an online study, participants were unable to ask directly if anything

458   in the research was unclear.

459   Additionally, the current study lacked content analysis. This is relevant because

460   Pennebaker (1997) discovered that individuals who use positive emotional words extensively,

461   a moderate number of negative emotional words and demonstrated coherence in their writing,

462   obtained the most benefits when writing about past experiences. Furthermore, Bearger and

463   McAdams (1999) showed that life story coherence demonstrated a significant relationship to

464   PWB (Baerger & McAdams, 1999). Although the authors' had access to the written content

465   of the interventions, duration of participation and consequently whether the interventions

466   went as intended to some extent, the current study lacked content analysis of the written

467   interventions. Therefore, it is unknown how much coherence and emotional wording were in

468   participants writing and to what extent they interpreted their experiences. Also, it is unclear

469   whether participants' goals were self-concordant which has been underlined as a necessary

470   element in providing a sense of purpose (Sheldon & Elliot, 1999). Therefore, it is important

471   for future studies to include a language content analysis to assess whether greater language

472   coherence, emotional wording and self-concordance goal setting are related to increased

473   experience of MIL, SWB and PWB and PA.

474   Lastly, the interventions emphasized solely the motivational- and cognitive

475   components of MIL and left out the evaluative component. The focus of the study was based

476   on Martela & Steger (2016) suggestion that future studies would benefit to research the facets

477   of meaning separately. However, as the study by Costin & Vignoles showed that the

478   evaluative component, *a sense of mattering*, was a greater precursor of MIL than purpose and

479   significance, therefore, future studies could also aim to include an intervention that addresses

480   the evaluative component. Particularly, the area of self-transcendence could be worth

481   exploring in relation to MIL. As sense of mattering refers to the belief that one's actions

482   make a difference in the world and Wong et al (2021) proposed that sense of self-

483   transcendence promotes that belief.

484   **Conclusion**

485   A brief and easily administered online meaning in life intervention which includes

486   personal goal setting and a life story review enhanced positive affect among the Icelandic

487   adults in the current sample. Although the interventions did not increase MIL, it is hoped that

488   future studies will assess the effectiveness of the interventions on MIL and other wellbeing

489   measures based on the aforementioned suggestions. This low-cost intervention could be

490   utilized to help adults within the general population to experience positive emotions which

491   can start an upward spiral towards increased wellbeing (Fredrickson, 1998). The study offers

492   a meaningful conclusion and future avenues to enhance intervention studies to develop

493   essential elements of wellbeing and human functioning within general populations.

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