

A Brief Meaning in Life Intervention and Flow

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Abstract

Meaning in Life is an important concept to study, since it is related to many vital outcomes. Based on previous literature, we hypothesize that it could be increased by the pursuit of intrinsic goals and by a higher occurrence of flow. We further propose that the pursuit of intrinsic goals can increase the occurrence of flow, meaning that flow can mediate the relationship between these two important concepts. To test these ideas, an intervention based on intrinsic goals was applied to a sample of students ($n = 97$). While the intervention was effective in increasing the participants' experienced meaning a week later, there was no effect on flow and, correspondingly, flow did not mediate in-between the group assignment and the change in meaning. Finally, a series of design modifications is suggested, so the relationship between the concepts could be better tested in a next experiment. Regardless, the study shows that a brief online intervention based on the pursuit of intrinsic goals can increase participants' meaning in life.

A Brief Meaning in Life Intervention and Flow

Having some meaning in life (MiL), explicitly or implicitly, is important for enjoying it and for remaining resilient when faced with hardships. The highly absorbing and enjoyable experience of flow may in turn have a positive effect on one's perceived meaning. In this study, we present a brief meaning intervention and assess whether it can increase MiL and whether the experience of flow may act as a mechanism of this effect. Before that, however, we need to situate the intervention among previous research. First, we describe what MiL is and why it matters. Second, we connect intrinsic goals to MiL, since the former form the backbone of our intervention. Third, we mention why the state of flow may mediate the relationship between intrinsic goals and MiL. Lastly, we present the specific hypotheses meant to test our intervention and the relationship between the above-mentioned concepts.

Meaning in Life

Implicitly or explicitly, we all have our own meanings in life - what we value and find important in our existence. Unfortunately, psychologists and philosophers also have different meanings in life - in the way they define them. We will follow a tripartite model of MiL, according to which lives are meaningful when they "have purpose, significance beyond the trivial or momentary and a coherence that transcends chaos" (King et al., 2006, p. 180). Purpose, a motivational component, refers to the extent that people experience their lives as guided by their core goals (Martela & Steger, 2016). Significance is an affective component, it is a feeling that one's life is important and inherently valuable. Coherence is a cognitive component that measures whether people's lives make sense to them. Defining the concept is important because the definition guides how we measure the concept itself. We have chosen a tripartite model, since its development was a step towards integrating MiL literature with broader meaning literature, which includes theories of meaning making and terror management (George & Park, 2016). Additionally, dividing MiL into its hypothesized

components clarifies the ambiguity of the concept and allows measuring it beyond directly asking participants to indicate their level of “meaning”, whatever it might be for them.

Various research groups have independently arrived at this conceptualization and there are multiple studies supporting such a division of MiL (King & Hicks, 2021). However, it is important to note that most studies we refer to in the next paragraphs used different operationalizations and measurements of the concept.

High MiL was found to be beneficial for a number of important outcomes in different populations. It was shown to be a protective factor for people undergoing traumatic experiences, it is negatively associated with rumination and distress as well as with depression and anxiety (Debats, 1996; Ostafin & Proulx, 2020; Steger et al., 2009). It has also been longitudinally linked to a higher well-being in cancer patients and to a lower physiological response to negative stimuli (Park et al., 2008; Schaefer et al., 2013). While most of the studies were correlational, there are also experiments that causally link MiL with positive outcomes. In one such study, participants watched a movie scene involving racially motivated violent assault after which they took part in either the experimental or one of the two control conditions (Ostafin & Proulx, 2023). In the experimental group, participants read and summarized a life-purpose text after which they wrote 125 words or less about what is most important in their life. The relevant control did a similar task, but the text was about racial equality and they wrote about its importance. The irrelevant control group read and summarized an essay about computers. As a result, the experimental group did not only experience an increased MiL, but also less anxiety and rumination compared to both control groups. The protective function of MiL inductions by various methods have been replicated in other experiments as well (Creswell et al., 2005; Todorovic et al., 2024). Apart from experimental designs, several meaning-centered psychotherapies have resulted in major improvements for participants on measures of anxiety, depression, and quality of life, which

were on par with other therapy methods and exceeding the control conditions (Thomas et al., 2014; Marco et al., 2023). Hence, there are multiple benefits for having a higher MiL for both clinical and non-clinical populations.

Possible contributors to MiL

One potential method of increasing MiL could be the pursuit of intrinsic goals, a concept derived from the self-concordance model (Sheldon & Elliot, 1999). According to the model, intrinsic goals reflect a “person's authentic interests and values” (Sheldon & Elliot, 1999, p. 483), rather than being imposed by outside pressure or momentary motives and gains. Achieving such goals is connected to a higher satisfaction and well-being when compared to achieving extrinsic goals. Moreover, we can hypothesize that the pursuit of intrinsic goals is connected to the tripartite model of MiL. That is, someone pursuing goals aligned with their authentic self may experience a higher feeling of purpose, since such a pursuit will be experienced as guided by what they consider important. Further, if their decisions are guided by their self-imposed values, their life may be easier constructed in a coherent narrative, leading to a higher comprehension. Lastly, a life driven by their own values rather than by others' will or circumstances will likely be perceived as more significant. Indeed, there are some empirical links between intrinsic goals and MiL. It was previously found in two independent samples that the participants who rated their goals as more intrinsic also had a higher MiL as measured on all three dimensions (Sangeorzan et al., 2024). Following this rationale, our intervention aimed to increase participants' MiL by making them identify their core values and pursue a self-concordant goal of their choice.

Further, the pursuit of intrinsic goals is also likely to increase the frequency of the flow state experiences. Flow, according to the founder of the concept, is a „unified [experience] from one moment to the next, in which we feel in control of our actions, and in which there is little distinction between self and environment“ (Csikszentmihalyi, 1975, p.

43). Over the years, there have been multiple attempts to conceptualize flow and in particular to discern its antecedents from its components. In a recent scoping review of psychological flow, it has been found that high motivation for an activity or its perceived importance is one of the key antecedents to experiencing flow (Norsworthy et al., 2021). Seeing how self-concordant goals are by definition important for participants and thereby also motivating, we hypothesize that they could increase participants' frequency of flow experiences. As an example, Csikszentmihalyi (1975) often described the experience of flow in chess-players, dancers and rock climbers - in people who engaged in activities that are mostly enjoyable due to being intrinsically rewarding. To date, there does not seem to be any empirical evidence connecting these concepts, so our study could serve to fill in this gap in academic literature.

Increasing the occurrence of psychological flow is important, since it can contribute to a higher experienced MiL. There is not a clear link between flow and MiL, but according to Wolf and Koethe (2010, p. 9): "a person's life can be meaningful only if she cares fairly deeply about some thing or things, only if she is gripped, excited, interested, engaged". Flow can be considered a higher, more encompassing form of engagement with the task at hand, and that engagement also brings about joy and excitement. It is also possible that the rewarding nature of flow experiences can lead to a higher sense of significance, since it is an affective aspect of MiL. Therefore, there is a theoretical rationale to believe that flow by itself can contribute to a meaningful life. The empirical connection between the two concepts is scarce, but there is some evidence that higher levels of MiL are connected to a higher frequency of flow at work (Bujanover et al., 2022). One limitation of this previous study for our purposes is that the authors specifically measured work-related flow rather than a general measure of flow in daily life. Nonetheless, we can overall hypothesize that pursuing intrinsic goals can lead to a higher frequency of the flow state, and the flow state itself can contribute

to a more meaningful life. Correspondingly, part of the intervention's effect on MiL could be explained by the intermediate effect on the occurrence of flow.

Current Study

Based on the above-mentioned theoretical connections, we assessed whether the newly developed intervention can increase participants' MiL and whether this effect is mediated by an increase in flow. The advantage of this meaning-centered intervention is that does not require the presence of any trained specialists to administer, which is helpful in the face of an increasing number of psychopathologies and their burden on the healthcare (Wu et al., 2023). Further, we can address the lack of any literature empirically connecting flow to MiL. We compared the brief meaning intervention group with a control on the extent to which the intervention influenced MiL and flow in the subsequent week. Our specific hypotheses were:

Hypothesis 1. The intervention will increase participants' MiL compared to the control group as measured one week later.

Hypothesis 2. The intervention will increase participants' occurrence of flow compared to the control group as measured one week later.

Hypothesis 3. The effect of the intervention on the change in MiL will be partially mediated by the change in the occurrence of flow.

Methods

Participants

The participants were mostly students recruited from the University of Groningen, who either participated for monetary reward or for their course credits. Overall, 132 participants were recruited in the study. Excluding those of them who did not complete the follow-up ($n = 33$) or did not satisfy the selection criterion (self-report of at least a moderate fluency in English; $n = 2$), 97 remained (58 female, 39 male, $Mage = 20.41$, $SD = 2.7$). The

participants were of mixed nationalities: Dutch (35%), Indonesian (16%), German (8%) and others (41%). The current sample allowed a power of 0.16 to detect a main effect size f of 0.1, a power of 0.67 to detect an effect size f of 0.25 and a power of 0.97 to detect an effect size f of 0.4, which are small, medium and large effect sizes, respectively. We initially aimed for a sample of 150 participants, but the data collection period ended before we could reach the preregistered sample size.

Measures and Materials

Conditions

The intervention was developed by the main researcher. First, it included a video of Steve Jobs addressing Stanford graduates about life and death in order to encourage them to reflect on the meaning in life. To ensure engagement with the video, participants needed to briefly summarize it, about which they had been warned beforehand. Next, after an introduction, participants were shown a list with examples of intrinsic values to make it clear what those are and in case the participants could relate to any of those. Finally, they listened to an audio recording of 17 minutes that lies at the core of the intervention. During the audio, the participants first relaxed, then chose an important value of theirs and lastly set a specific goal aligned with the value. They relaxed via guided focusing method, a process similar to mindfulness that relies on important words and realizations emerging from bodily felt senses (Hendricks, 2007). The value they chose could be taken from a list provided beforehand or just thought of by the participants themselves - the key part is that it should have resonated with them. Lastly, the audio instructed them to pick a specific goal which is in line with the selected value and could be pursued over the next few days. Afterwards, the participants wrote down the goal they had chosen and rated how intrinsic it was to them based on a variety of questions. The intrinsicity of goals was not part of this thesis, but the questions

are mentioned since they could impact how the participants viewed their selected goals. This group took about one hour to finish the study.

The control condition consisted of filling in a questionnaire unrelated to the research question of this thesis – 10 aspects of Big Five Questionnaire (DeYoung et al., 2007). Therefore, the control condition took significantly less time to complete, taking only about half an hour.

Instruments

The key variable of MiL was measured using the 3-Dimensional Meaning (3DM) questionnaire developed by Martela and Steger (2023). The scale includes 11 items (e.g. “My life was full of value”) rated on a 7-point Likert scale from 1 (absolutely untrue) to 7 (absolutely true) answered regarding the one previous week. The items can also be split into three subscales according to the tripartite model of MiL, but it was not done for our purposes. The reliability of 3DM was assessed using Cronbach’s alpha. At the baseline it measured $\alpha = 0.93$, and $\alpha = 0.95$ at the follow-up.

Flow occurrence was measured using the Short Dispositional Flow Scale 2 (Jackson et al., 2008). This questionnaire consists of 9 items that are answered regarding an activity regularly undertaken by the participants in the previous week (such as “The experience is extremely rewarding”) with the answers being on a 5-point Likert scale, ranging from 1 (never) to 5 (always). In terms of reliability, SDFS-2 showed a Cronbach’s $\alpha = 0.73$ at the baseline and $\alpha = 0.72$ at the follow-up.

Procedure

First, the participants read and signed the consent form and received some verbal instructions. They were then randomly allocated to either the control or the intervention conditions by the Qualtrics software. In both conditions, they first completed a series of instruments including 3DM and the flow questionnaire as well as some unrelated

questionnaires, after which the experimental group continued with the intervention while the control group filled in the Big Five. A week later, all the participants received an email asking them to fill in some follow-up questions, including mostly the MiL and flow measurements.

Data analyses

The first hypothesis – that the intervention would increase MiL – was assessed with a repeated-measures ANOVA, with the condition representing the between-subjects factor and time representing the within-subjects factor. The second hypothesis – that the intervention would increase the occurrence of flow – was assessed similarly. To better understand the differences between the groups, post hoc multiple comparisons with Bonferroni correction were conducted.

The third hypothesis – that the change in MiL would be mediated by the change in the occurrence of flow – was modelled with a regression analysis using PROCESS v4.2 in SPSS. In order to incorporate the change between the baseline and the follow-up in a simple model, the dependent variable (MiL) and the mediator (flow) were in this case both computed as the difference between the two timepoints: follow-up minus baseline (Δ MiL and Δ flow, respectively). Therefore, the independent variable of the model was the condition, the mediator was set as Δ flow and the outcome variable was Δ MiL (see Fig. 3). The data files to replicate the results as well as the syntax we used are linked to in the appendix.

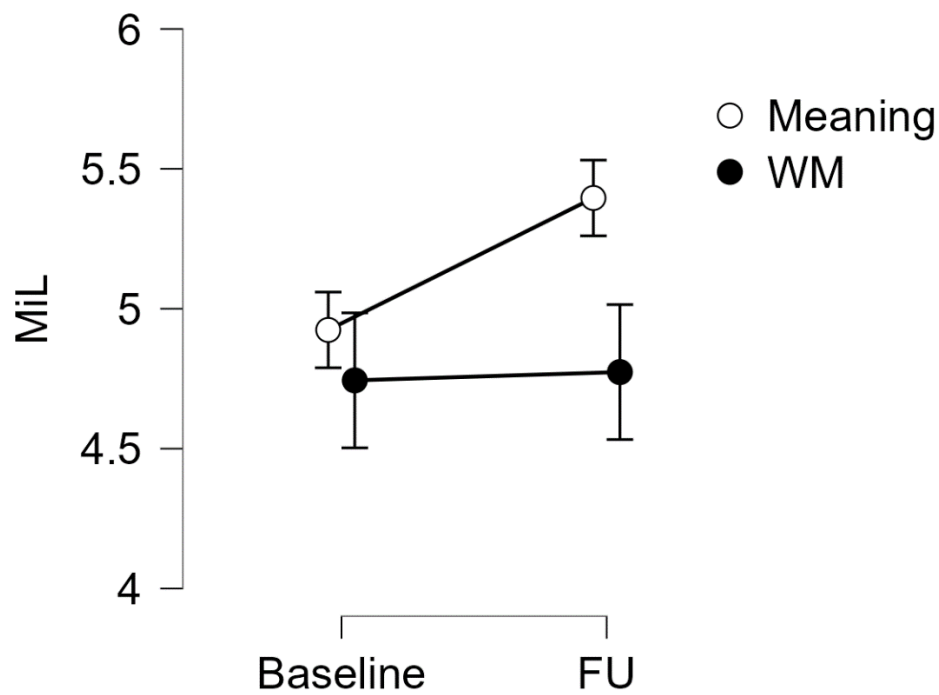
Results

No participants were excluded in order to satisfy the analysis assumptions. For the H1, the assumption checks showed that the MiL reports of both groups at baseline might come from a non-normally distributed population. Shapiro-Wilk test showed significant deviation for the control, $W(51) = 0.95$, $p = 0.046$, and the experimental group, $W(50) = 0.94$, $p = 0.016$. However, due to the postulates of the central limit theorem and the observed

distribution in the histograms (Fig. S1), we believe that the test results should be mostly unaffected.

For H1, a RM-ANOVA was conducted to formally test the difference between the follow-up and the baseline while accounting for the group membership (Table 1). There was a significant interaction between the timepoint and the condition, $F(1, 95) = 5.11, p = 0.026$, meaning that the change in MiL over time depended on the condition of the participants. As illustrated in the means plot, there was a spreading interaction from initially similar baseline groups to the unchanged control and the improved intervention group (Figure 1).

The post hoc multiple comparisons allowed us to calculate the magnitude of the differences between the subgroups. Of note, the mean difference between the FU and the baseline within the intervention group was of a significant magnitude ($M = 0.47, SE = 0.14, 95\% \text{ CI } [0.10, 0.85]$) and the intervention was estimated to have a medium effect size ($d = 0.39, 95\% \text{ CI } [0.07, 0.71]$). A similar comparison in the control group showed no significant difference ($M = 0.03, SE = 0.14, 95\% \text{ CI } [-0.34, 0.40]$). In other words, the intervention seemed to have a considerable effect, but the large spread of likely population values should warn us regarding the strength of the evidence. Furthermore, an inspection of the raincloud plots shows that the results are not simply due to outliers (Fig. S2). Rather, there seems to be a consistent pattern of an increase in MiL, which is not observed in the control group.

Figure 1***Means Plot of the Differences in MiL***

Note. The error bars in this and the other figures refer to the 95% CI

Table 1***Results of a RM-ANOVA testing the MiL Difference***

Within Subjects Effects

Cases	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Timepoint	3.046	1	3.046	6.574	0.012
Timepoint * Group	2.368	1	2.368	5.109	0.026
Residuals	44.025	95	0.463		

For H2, no assumptions were violated. The means plot does not suggest any significant difference, although it is possible that a spreading interaction is present, with the control group experiencing less flow over the week after the initial session (Fig. 2). Similar to H1, the conditions were compared using a RM-ANOVA. It showed no significant effect of either the within-subjects ($F(1, 95) = 2.18, p = 0.143$) or the between-subjects factors ($F(1, 95) = 1.43, p = 0.234$). Expectedly, there was also no interaction effect ($F(1, 95) = 0.89, p = 0.348$). Considering that the subgroups did not differ, post hoc multiple comparisons were not carried out.

Lastly, for H3, mediation analysis was carried out in SPSS, with the results schematically shown in Figure 3. The first step of the analysis showed that there was no relation between the independent variable, condition, and the mediator, change in the occurrence of flow ($B = 0.19, 95\% \text{ CI } [-0.21, 0.60]$). Conversely, there seemed to be a positive relationship between the change in the occurrence of flow and change in MiL ($B = 0.36, 95\% \text{ CI } [0.17, 0.54]$). Seeing how the mediator is associated with the dependent variable, but the independent variable is not associated with the mediator, the proposed model of mediation seems implausible.

Figure 2

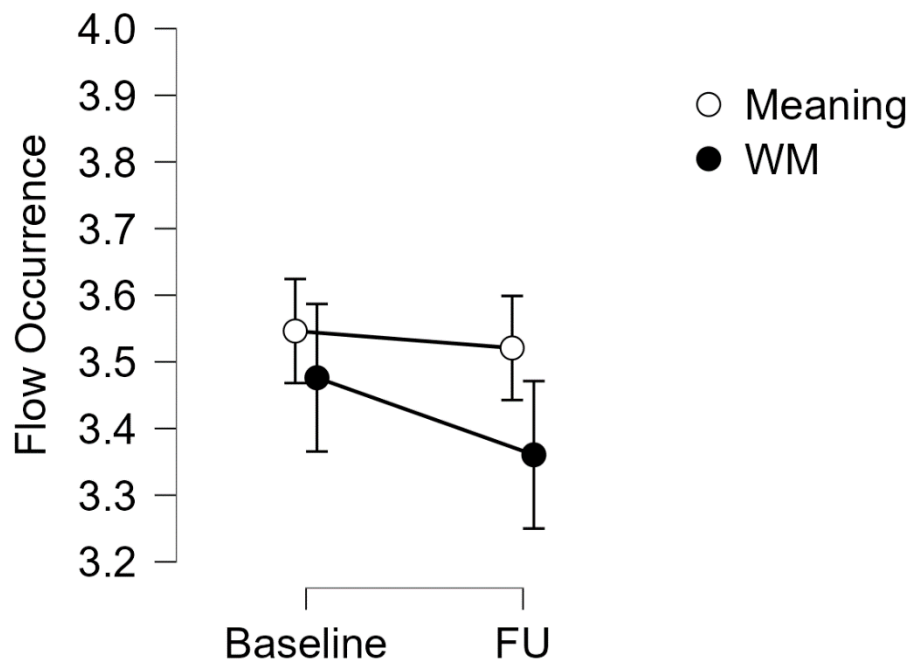
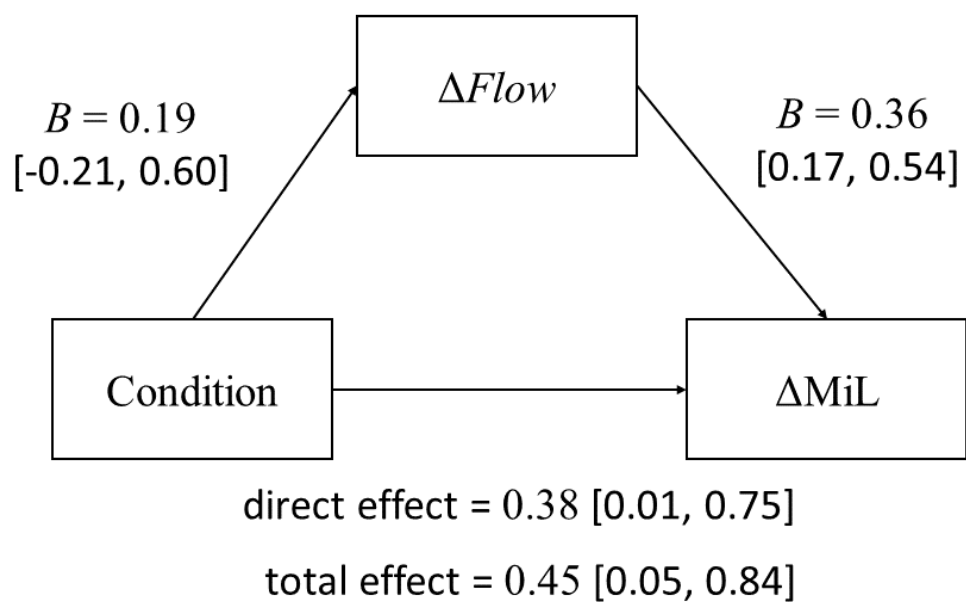
Means Plot of the Differences in Flow Occurrence

Figure 3

Schematic Representation of the Mediation Analysis

Note. The numbers and B represent standardized effects in-between variables. 95% CI for each are enclosed in the square brackets

Discussion

Our results support the first hypothesis that participants who experienced the MiL intervention would report a higher sense of meaning than those who did not. On the contrary, the results provide no support for the second hypothesis, since there was no difference in the occurrence of flow between the two groups, which remained virtually unchanged. Similarly, the third hypothesis received no support – flow did not seem to mediate the relationship between the pursuit of goals and meaning in life. In particular, while the relationship between the group assignment (IV) and change in flow (M) was not significant, there seemed to be a connection between the change in flow (M) and the change in MiL (DV).

Implications and future research

The interpretation of the first result is evident – an intervention lasting 30 to 40 minutes and not requiring the presence of a trained specialist is sufficient to induce a higher MiL which remains in effect even a week later. This outcome is aligned with the previous applications of this or highly similar interventions relying on the pursuit of intrinsic goals (Ostafin & Proulx, 2023; Todorovic et al., 2024; van Doornik et al., 2021). The effect size of the intervention was estimated to be medium, but the data is highly heterogenous. The spread in data could be because of participants pursuing or achieving their intrinsic goals at different times over the week. That is, someone who acted on their intrinsic goal right before the follow-up measurement is likely to report a higher change in MiL compared to someone who did it five days beforehand. To clarify this possibility, a subsequent study could ask the participants about the timeframe of pursuing their goal at the follow-up measurement.

While the pursuit of intrinsic goals was not related to the occurrence of flow in our study, this does not necessarily discredit the connection. Rather, this could be related to how the flow questionnaire is constructed. Before measuring the occurrence of flow over the

previous week, it first asks participants to choose an activity, be it studying, work, or whatever else, that they often undertake. Therefore, the activity that they answer questions about could be unrelated to the pursuit of their intrinsic goal. For instance, if someone pictures reading manuscripts when answering the questionnaire it is only natural that calling their childhood friend will have no effect on the occurrence of flow in the former activity. In the current study, it was chosen as an established measure of flow occurrence that could be administered both at the baseline and at the follow-up. While it could be rephrased to ask about the occurrence of flow in general rather than during a single commonly performed activity, it would need major alterations for that purpose. Still, the current phrasing of the questionnaire is a significant limitation of the study design. In a future study, the measurements could either ask about flow when pursuing the chosen intrinsic goal (which would remove the baseline measurements) or about flow occurrence in general after the questionnaire was rephrased. This alteration is especially worthwhile because the empirical connection between intrinsic goals and flow occurrence is not yet described in the academic literature.

On a related note, the above-mentioned design limitation could also explain why the occurrence of flow did not mediate the effect of the intervention on MiL. With a different measurement of flow, there would be a stronger rationale in the future for the data to either support or not support the third hypothesis. Still, the effect of flow occurrence on MiL in the mediation model supports the previously found correlation between flow and MiL (Bujanover et al., 2022). Thus, there seems to be a connection between the feeling of flow that participants experience in their everyday activities and their experience of meaning. In a future study with the modified flow occurrence instrument, the third hypothesis should be reassessed, since it could further provide the first causal evidence of flow affecting MiL.

Conclusion

In conclusion, a brief online intervention is promising in increasing people's MiL, although the effect did not seem to be mediated by flow. The outlined proposals for further investigation promise to untangle the complicated relationship between these three phenomena that are relevant in our daily lives. Overall, the self-concordance model provides a valuable tool to manipulate MiL. The intervention, based on that model, can prove useful to not only return patients to the baseline, but also to improve people's lives, an aspect that research so often neglects, and yet one that we, academics or not, are so concerned about as we try to live a fulfilling life.

References

- Bujanover, M., Mashiach-Eizenberg, M., & Moran, G. S. (2022). Meaning in life and flow experiences among people with psychiatric disabilities who are engaged in peer-helping vs. non-helping work-roles. *Journal of Vocational Rehabilitation, 57*(3), 275–287. <https://doi.org/10.3233/JVR-221217>
- Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T. L., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science, 16*(11), 846–851.
- Csikszentmihalyi, M. (1975). Play and intrinsic rewards. *Journal of Humanistic Psychology, 15*(3), 41–63. <https://doi.org/10.1177/002216787501500306>
- Debats, D. L. (1996). Meaning in life: Clinical relevance and predictive power. *The British Journal of Clinical Psychology, 35*(4), 503–516.
- DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*(5), 880–896.
- George, L. S., & Park, C. L. (2016). Meaning in Life as Comprehension, Purpose, and Mattering: Toward Integration and New Research Questions. *Review of General Psychology, 20*(3), 205–220. <https://doi.org/10.1037/gpr0000077>
- Hendricks, M. N. (2007). Focusing-Oriented Experiential Psychotherapy: How To Do It. *American Journal of Psychotherapy, 61*(3), 271–284. <https://doi.org/10.1176/appi.psychotherapy.2007.61.3.271>
- Jackson, S. A., Martin, A. J., & Eklund, R. C. (2008). Long and Short Measures of Flow: The Construct Validity of the FSS-2, DFS-2, and New Brief Counterparts. *Journal of Sport and Exercise Psychology, 30*(5), 561–587. <https://doi.org/10.1123/jsep.30.5.561>

- King, L. A., Hicks, J. A., Krull, J. L., & Del Gaiso, A. K. (2006). Positive affect and the experience of meaning in life. *Journal of Personality and Social Psychology, 90*(1), 179–196. <https://doi.org/10.1037/0022-3514.90.1.179>
- King, L. A., & Hicks, J. A. (2021). The science of meaning in life. *Annual Review of Psychology, 72*, 561–584. <https://doi.org/10.1146/annurev-psych-072420-122921>
- Marco, J. H., Martínez-Micó, A., García-Alandete, J., Guillén, V., Grimaldos, J., Pérez, S., & Quero, S. (2023). A systematic review of the effectiveness of meaning-centred psychotherapies in depressed participants. *Clinical Psychology & Psychotherapy, 31*(1), 1-12. <https://doi.org/10.1002/cpp.2936>
- Martela, F., & Steger, M. F. (2016). The three meanings of meaning in life: Distinguishing coherence, purpose, and significance. *The Journal of Positive Psychology, 11*(5), 531–545. <https://doi.org/10.1080/17439760.2015.1137623>
- Martela, F. & Steger, M. F. (2023). The role of significance relative to the other dimensions of meaning in life - an examination utilizing the three dimensional meaning in life scale (3DM). *The Journal of Positive Psychology, 18*(4), 606–626. <https://doi.org/10.1080/17439760.2022.2070528>
- Norsworthy, C., Jackson, B., & Dimmock, J. A. (2021). Advancing our understanding of psychological flow: A scoping review of conceptualizations, measurements, and applications. *Psychological Bulletin, 147*(8), 806–827. <https://doi.org/10.1037/bul0000337>
- Ostafin, B. D., & Proulx, T. (2020). Meaning in life and resilience to stressors. *Anxiety, Stress and Coping, 33*(6), 603–622. <https://doi.org/10.1080/10615806.2020.1800655>
- Ostafin, B. Danger, & Proulx, T. (2023). A brief life-purpose intervention reduces trauma-film anxiety and rumination. *The Humanistic Psychologist, 51*(4), 397–406. <https://doi.org/10.1037/hum0000298>

- Park, C. L., Edmondson, D., Fenster, J. R., & Blank, T. O. (2008). Meaning making and psychological adjustment following cancer: The mediating roles of growth, life meaning, and restored just-world beliefs. *Journal of Consulting and Clinical Psychology, 76*(5), 863–875. <https://doi.org/10.1037/a0013348>
- Sangeorzan, P. C., Goodson, W. L., & Bohon, L. M. (2024). The why to bear any how: Goal self-concordance, meaning, and depressive and anxious symptomatology. *International Journal of Applied Positive Psychology*. <https://doi-org.proxy-ub.rug.nl/10.1007/s41042-024-00158-1>
- Schaefer, S. M., Morozink Boylan, J., van Reekum, C. M., Lapate, R. C., Norris, C. J., Ryff, C. D., & Davidson, R. J. (2013). Purpose in life predicts better emotional recovery from negative stimuli. *PloS One, 8*(11), e80329. <https://doi.org/10.1371/journal.pone.0080329>
- Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology, 76*(3), 482–497.
- Steger, M. F., Mann, J. R., Michels, P., & Cooper, T. C. (2009). Meaning in life, anxiety, depression, and general health among smoking cessation patients. *Journal of Psychosomatic Research, 67*(4), 353–358. <https://doi.org/10.1016/j.jpsychores.2009.02.006>
- Thomas, L. P., Meier, E. A., & Irwin, S. A. (2014). Meaning-centered psychotherapy: A form of psychotherapy for patients with cancer. *Current psychiatry reports, 16*(10), 488. <https://doi.org/10.1007/s11920-014-0488-2>
- Todorovic, L., Huisman, M., & Ostafin, B. D. (2024). Targeting mechanisms for problematic pornography use interventions. *Sexual Health & Compulsivity, 31*, 1–28.

van Doornik, S. F. W., Glashouwer, K. A., Ostafin, B. D., & de Jong, P. J. (2021). The causal influence of life meaning on weight and shape concerns in women at risk for developing an eating disorder. *Frontiers in Psychology, 12*, 593393.

doi:10.3389/fpsyg.2021.593393

Wolf, S. R., & Koethe, J. (2010). *Meaning in life and why it matters*. Princeton University Press.

Wu, Y., Wang, L., Tao, M., Cao, H., Yuan, H., Ye, M., Chen, X., Wang, K., & Zhu, C. (2023). Changing trends in the global burden of mental disorders from 1990 to 2019 and predicted levels in 25 years. *Epidemiology and psychiatric sciences, 32*, e63.

<https://doi.org/10.1017/S2045796023000756>

Appendix

The data files and syntax used are accessible in the online folder:

<https://drive.google.com/drive/folders/1v61QNaYbZuK1pEvD60IvyPRpl6tkAw0z?usp=sharing>

Figure S1

Distribution Histograms of MiL in Control (C) and Intervention (I) Groups at the Baseline

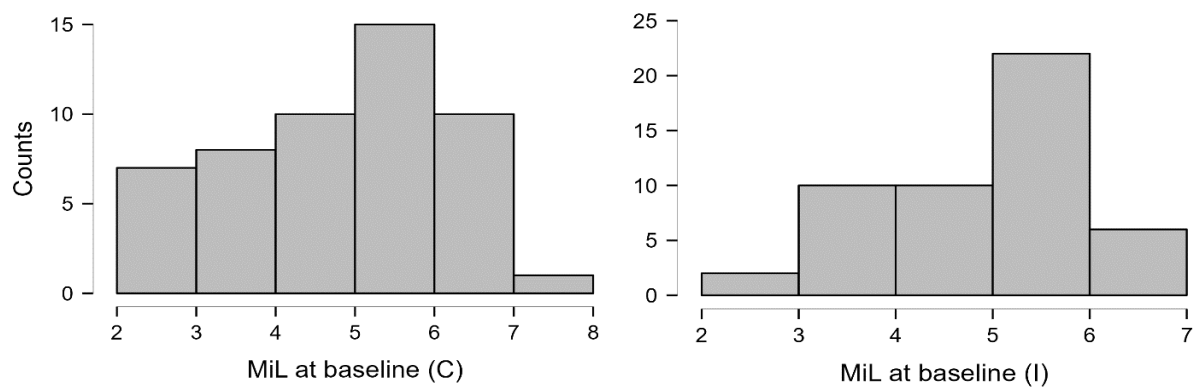


Figure S2

Raincloud Plots of MiL Across Time, Split Per Condition

