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The longitudinal relationship between flourishing mental health and incident mood, anxiety and substance use disorders

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Background: High levels of mental well-being might protect against the onset of mental disorders but longitudinal evidence is scarce. This study examines whether flourishing mental health predicts first-incidence and recurrent mental disorders 3 years later. **Methods:** Data were used from 4482 representative adults participating in the second (2010–12) and third wave (2013–15) of the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2). Mental well-being was assessed with the Mental Health Continuum-Short Form (MHC-SF) at the second wave. The classification criteria of this instrument were used to classify participants as having flourishing mental health: high levels of both hedonic well-being (life-satisfaction, happiness) and eudaimonic well-being (social contribution, purpose in life, personal growth). DSM-IV mood, anxiety and substance use disorders were measured with the Composite International Diagnostic Interview (CIDI) 3.0 at all waves. Odds ratios of (first and recurrent) incident disorders were estimated, using logistic regression analyses adjusting for potential confounders. **Results:** Flourishing reduced the risk of incident mood disorders by 28% and of anxiety disorders by 53%, but did not significantly predicted substance use disorders. A similar pattern of associations was found for either high hedonic or high eudaimonic well-being. Significant results were found for substance use disorders when life-events and social support were removed as covariates. **Conclusion:** This study underscores the rationale of promoting mental well-being as a public mental health strategy to prevent mental illness. In wealthy European nations it seems fruitful to measure and pursuit a flourishing life rather than merely high levels of hedonic well-being.

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Introduction

Promoting mental well-being has been recognized as the primary goal for public mental health in Europe[1] because of its benefits for individual health and society.[2–4] Hedonic well-being has long been the focus in epidemiological research and consists of feelings of happiness, life-satisfaction and positive affect. Many well-being interventions have been developed to increase happiness, for example by keeping a diary of positive emotions.[5] However, mental well-being captures not solely hedonic well-being, but eudaimonic well-being as well. The latter often includes aspects of psychological well-being (e.g. purpose in life, self-acceptance, personal growth) and social well-being (e.g. social acceptance, social contribution).[6,7] Eudaimonic well-being is more complex and can be elevated by activities like strengthening active listening skills, practicing mindfulness and performing acts of kindness.[8] When people have optimal levels of both hedonic and eudaimonic well-being, they can be defined as having flourishing mental health. This status has been related to the most favourable health outcomes compared with having high levels of either hedonic or eudaimonic well-being and suggests that well-being interventions should focus both on feeling happy and doing well.[4,9–12]

Recent longitudinal evidence indicates that higher levels of mental well-being is protective for incident mental health problems.[9,13–15] Hence, flourishing might contribute to the reduction of the global burden of mental illness mainly caused by mood, anxiety and substance use disorders.[16] However, little is known about the protective role of flourishing in first-onset and recurrence of these mental disorders.[9] To address this gap in the literature, the present study tested the hypothesis that flourishing is a significant protective factor for a broad range of first-incident and recurrent mood and anxiety disorders as well as for substance use disorders in a representative sample during a 3-year time span. The current study also explores whether high hedonic or high eudaimonic well-being predict mental disorders independently.

Method

The national representative Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2) recruited adults aged 18–64 years, using a multistage and stratified random sampling of private households. In every eligible household, one person was randomly selected for a lay-administered face-to-face interview. NEMESIS-2 consists of three waves in which respondents were followed over time: T0 took place between November 2007 and July 2009 ($n = 6646$, response rate 65.1%; average interview duration 95 min), T1 between November 2010 and June 2012 ($n = 5303$, response rate 80.4%; average interview duration 84 min), and T2 between November 2013 and June 2015 ($n = 4618$, response rate 87.8%; average interview duration 83 min). Attrition between T0 and T1[17] and between T1 and T2[18] was not significantly associated with any of the 12-month mental disorders at T0 controlled for sociodemographics, except for alcohol and drug dependence at T1 which were significantly related with attrition at T2.[18] The NEMESIS-2 study proposal was approved by an independent Medical Ethics Committee and all participants provided written

informed consent. More details about the design has been described elsewhere.[17–19]

Mental well-being was assessed at T1 and T2. Mental disorders were assessed at all waves of which the T0 measured lifetime disorders and 12-months disorders and the T1 and T2 measured 3-years disorders and 12-months disorders, respectively. In this paper, we used data of mental well-being at T1 to predict incident mental disorders (any mood, anxiety or substance use disorder) at T2. These incident disorders were defined as having a first-incident disorder at T2 (individuals were free of any disorder as reported at T0 and T1) or a recurrent disorder at T2 (individuals had reported a mental disorder at T0 or T1 but had no mental disorder 12 months prior to T1). The total sample of the current study consisted of 4482 respondents because participants with any 12-month mental disorder at T1 were excluded.

Measures

The Dutch version of the 14-item Mental Health Continuum-Short Form (MHC-SF) has shown good psychometric properties[20,21] and captures three hedonic well-being items and eleven eudaimonic well-being items, scored on a 6-point scale ranging from 0 to 5. The frequency of each 'symptom' of mental well-being during the past 4 weeks was, in our study, answered with never, rarely, sometimes, regularly, often or (almost) always. These answer categories differ slightly from its original scale without losing its type of frequency, to make it easier for the respondents to recall. The classification framework of the MHC-SF was applied to our data, categorizing people into 'flourishing', 'moderate mental health' or 'languishing'.[6] Opposed to a diagnoses of major depression, flourishing mental health postulates scores of 4 or 5 on at least one item of hedonia (rather than anhedonia; items 1–3) and at least six items of positive functioning or eudaimonia (rather than malfunctioning; items 4–14).[20] All other people were classified as 'non-flourishing' due to few people with languishing mental health (1.6%).[22] Furthermore, persons with flourishing mental health were compared with persons who scored high on the hedonic well-being criteria (vs. non-high hedonic well-being) or high on the eudaimonic well-being criteria (vs. non-high eudaimonic well-being). To maximize sample size, missing data on one or more items of the MHC-SF at T1 (6.1%: 282 items of 73 participants) were imputed by Hotdeck imputation using gender, age categories and educational attainment as predictor variables.[23] Almost identical results were found when missing data were listwise deleted.

DSM-IV diagnoses were ascertained with the fully structured Composite International Diagnostic Interview (CIDI) 3.0.[24] The common disorders measured at all three waves were any mood disorder (major depression, dysthymia and bipolar disorder), any anxiety disorder (panic disorder, agoraphobia, social phobia, specific phobia and generalized anxiety disorder) and any substance use disorder (alcohol/drug abuse and dependence). For every category of disorders, populations at risk were calculated—defined as individuals without a 12-month mental disorder at T1.

Potential confounders of the association between mental well-being and mental disorders included the sociodemographics[9,15,22,25] gender, age at T1, educational attainment, cohabitation status, having children, employment status, but also having any physical disorder,[15] smoking in previous 4 weeks,[26] physically active in sports,[26] negative life-events,[22] positive life-events[22] and perceived social support.[22,25]

Presence of one or more physical disorders was obtained from a standard checklist of 17 chronic physical disorders, treated or monitored by a medical doctor in the 12 months before T1 (e.g. asthma, diabetes, chronic back pain). Presence of one or more negative and positive life-events in the 12 months before T1 were, respectively, assessed with 9 items (e.g. death of a relative or friend, divorce) and 6 items (e.g. recovery from serious disease or injury of a relative or friend, financial advancement). Perceived social support

from three resources (partner, family or friends, neighbours) was measured with two questions on instrumental and emotional support from each of these resources in the close network. These referred to the extent respondents could rely on them for help if they had a problem and could open up to them if they needed to talk about worries. The four response categories ranged from one (not at all) to four (a lot). Any perceived social support was calculated as the mean score from at least two resources—because not all respondents had a partner at the time of interview—taking the respondent's evaluation of it into account. All covariates were measured at T1, except for educational attainment which was measured at T0.

Statistical analysis

All analyses were performed with SPSS 22.0 for Windows. Weighted percentages and means were obtained for all variables to describe the sample. Differences between individuals with flourishing and non-flourishing mental health, high hedonic and non-high hedonic well-being, and high eudaimonic and non-high eudaimonic well-being were examined, using χ^2-tests and independent t-tests. Populations at risk were calculated for each DSM-IV category of disorders (mood, anxiety and substance use). Subsequently, 3-year incidence rates were calculated based on weighted data to adjust for household non-response at T0 and response rate differences among several sociodemographic groups at T0, T1 and T2.[17] The T2-weight factor ensures the generalisability of incident cases to the general Dutch population. Finally, logistic regression analyses were used to determine whether each mental well-being category (flourishing, high hedonic well-being and high eudaimonic well-being) predicted first-incident and recurrent mental disorders 3 years later. These analyses were performed with unweighted data because we wanted to explain rather than describe the influence of mental well-being on incident mental disorders. In total, 12 fully adjusted logistic regression models were performed, generating odds ratios for each incident mental disorder category. Potential confounders at T1 were included in the analyses if they were significantly associated ($P < 0.05$) with one or more mental disorder categories at T2 and with one or more mental well-being categories at T1.

Results

About one in three persons at risk for any mental disorder were categorized as having flourishing mental health (38.9%), with 80.7% possessing high hedonic well-being and 40.8% possessing high eudaimonic well-being. Among those at risk for any mental disorder, people with flourishing mental health were significantly younger, of female gender, higher educated and in paid employment compared with people with non-flourishing mental health (table 1). Being physically active in sports, experiencing one or more positive life-events and perceiving more social support were also significantly more pronounced in people who were flourishing. Some of these significant associations were not found when examining high hedonic well-being separately (i.e. education, employment status, being physically active in sports, positive life-events) (not in table 1). High hedonic well-being was also significantly and positively related with having children and non-smoking ($P < 0.05$). High eudaimonic well-being resemble flourishing mental health.

Table 2 shows the at-risk populations and incident rates of mental disorders in the total sample and for flourishing vs. non-flourishing. The incidence of any mental disorder was 11.5% in the total sample. Of the individual mental disorder categories, the highest incidence was observed for any anxiety disorder (6.3%). The 3-year incidence of each mental disorder category was significantly lower for flourishers than for non-flourishers ($P < 0.05$), except for any substance use disorder ($P = 0.077$). In the flourishing sample, the highest incidence rate was found for any mood disorder (4.3%), while in

Table 1 Sample characteristics of respondents at risk for any mental disorder across flourishing (n = 1593) and non-flourishing (n = 2509) mental health at T1

	Flourishing n (%)	Not flourishing n (%)	P^b
Gender (male)	662 (46.0)	1202 (54.0)	<0.001
Age (years)	44.36 ± 13.03	46.43 ± 12.75	<0.001
21–27	111 (11.7)	130 (9.1)	
28–37	272 (21.9)	333 (17.0)	
38–47	418 (24.1)	653 (25.5)	
48–57	395 (23.4)	632 (25.0)	
58+	397 (18.9)	761 (23.5)	<0.001
Educational attainment[a]			
Primary-basic vocational	46 (4.8)	114 (6.7)	
Lower secondary	351 (20.3)	702 (22.8)	
Higher secondary	498 (40.6)	789 (41.7)	
Higher professional—university	698 (34.2)	904 (28.8)	<0.001
Cohabitation status (with partner)	1205 (75.2)	1822 (72.7)	0.088
Having children			
No children	365 (28.1)	615 (28.4)	
Children living at home	762 (48.1)	1081 (45.2)	
Children not living at home	466 (23.8)	813 (26.4)	0.123
Employment status (paid employment)	1220 (79.1)	1810 (74.5)	0.001
Smoking last month (presence)	365 (24.8)	605 (24.1)	0.626
Physically active in sports (presence)	1024 (64.7)	1536 (60.0)	0.003
Physical disorder (presence)	641 (38.6)	1059 (39.1)	0.736
Negative life-events (presence)	695 (42.1)	1107 (44.1)	0.235
Positive life-events (presence)	712 (46.2)	916 (38.1)	<0.001
Social support	3.50 ± 0.53	3.35 ± 0.58	<0.001

[a]Measured at T0, while all other variables were measured at T1.
[b]Significant differences between flourishing and non-flourishing using χ^2-tests and independent t-tests.

Table 2 Three-year incidence rates of mental disorders at T2 for the total sample, and respondents with flourishing and non-flourishing mental health at T1

	Total sample		Flourishing		Not Flourishing		
	At-risk population n	3-year incidence n (%)	At-risk population n	3-year incidence n (%)	At-risk population n	3-year incidence n (%)	P
Any mood disorder	4391	247 (5.5)	1675	77 (4.3)	2716	170 (6.2)	0.004
Any anxiety disorder	4338	240 (6.3)	1659	58 (3.9)	2679	182 (7.8)	<0.001
Any substance use disorder	4482	138 (4.2)	1660	39 (3.5)	2822	99 (4.6)	0.077
Any mental disorder	4102	442 (11.5)	1593	142 (9.2)	2509	300 (13.0)	<0.001

n is unweighted data, % is weighted data.
Incidence includes first and recurrent incident cases.

the non-flourishing sample this was observed for any anxiety disorder (7.8%).

We also calculated first and recurrent incident rates for individuals with high hedonic vs. non-high hedonic well-being and for individuals with high eudaimonic vs. non-high eudaimonic well-being (table 3). Contrary to the results displayed in table 2, all mental disorder categories did significantly differ between having high hedonic well-being and non-high hedonic well-being (P < 0.01), thus also for any substance use disorder. The highest incidence rate was found for any anxiety disorder (11.4%) among individuals with non-high hedonic well-being. For eudaimonic well-being, similar results were found compared with flourishing mental health.

The logistic regression models showed that flourishing significantly predicted any incident mental disorder 3 years later (OR = 0.69, 95% CI = 0.55–0.86, P = 0.001), controlling for a variety of potential confounders (table 4). Flourishing was also significantly associated with decreased odds ratios of any mood disorder (OR = 0.72, 95% CI = 0.54–0.96, P = 0.027) and any anxiety disorder (OR = 0.47, 95% CI = 0.34–0.64, P < 0.001). In other words, flourishing reduced the risk of developing a mood

disorder by 28% and for an anxiety disorder by 53% in a 3-year interval. The odds ratio of any substance use disorder revealed non-significant results (P = 0.088).

When examining high hedonic and high eudaimonic well-being as predictor of mental disorders, we found similar odds ratios as were found for flourishing mental health (table 4). The largest difference was found in the odds ratios for any mood disorder, which was stronger for high hedonic well-being (OR = 0.52, 95% CI = 0.39–0.70, P < 0.001) compared with flourishing (OR = 0.72, 95% CI = 0.54–0.96, P = 0.027) and high eudaimonic well-being (OR = 0.75, 95% CI = 0.57–1.00, P = 0.048). These results might indicate that 'having often or almost always a satisfying or happy life' is a better predictor of mood disorders than 'having often or almost always a meaningful life'. However, merely 1.9% of the people possessed high eudaimonic well-being in the absence of high hedonic well-being, suggesting that the mental well-being categories were more similar than distinct in the current sample because almost all people with high eudaimonic well-being also possess high hedonic well-being, and are thus also flourishing. Notable, when positive life-events and social support were removed from the regression analyses, substance use disorders

Table 3 Three-year incidence rates of mental disorders at T2 for respondents with high hedonic vs. non-high hedonic well-being and high eudaimonic vs. non-high eudaimonic well-being at T1

	High hedonic well-being		Non-high hedonic well-being		P	High eudaimonic well-being		Non-high eudaimonic well-being		P
	At-risk population n	3-year incidence n (%)	At-risk population n	3-year incidence n (%)		At-risk population n	3-year incidence n (%)	At-risk population n	3-year incidence n (%)	
Any mood disorder	3545	168 (4.5)	846	79 (9.4)	<0.001	1753	83 (4.4)	2638	164 (6.2)	0.010
Any anxiety disorder	3490	159 (5.0)	848	81 (11.4)	<0.001	1736	67 (4.4)	2602	173 (7.6)	<0.001
Any substance use disorder	3551	94 (3.5)	931	44 (6.5)	0.001	1738	43 (3.7)	2744	95 (4.5)	0.188
Any mental disorder	3347	326 (10.2)	755	116 (17.3)	<0.001	1666	154 (9.6)	2436	288 (12.9)	0.001

n is unweighted data, % is weighted data.
Incidence includes first and recurrent incident cases.

Table 4 Logistic regression predicting T2 incidence of mental disorder from T1 mental well-being adjusted for possible confounders, unweighted data

	Any 3-year incident mood disorder Fully adjusted OR (95% CI)	Any 3-year incident anxiety disorder Fully adjusted OR (95% CI)	Any 3-year incident substance use disorder Fully adjusted OR (95% CI)	Any 3-year incident mental disorder Fully adjusted OR (95% CI)
Flourishing	**0.72 (0.54–0.96)**	**0.47 (0.34–0.64)**	0.71 (0.48–1.05)	**0.69 (0.55–0.86)**
High hedonic well-being	**0.52 (0.39–0.70)**	**0.48 (0.36–0.64)**	0.68 (0.46–1.01)	**0.62 (0.49–0.79)**
High eudaimonic well-being	**0.75 (0.57–1.00)**	**0.54 (0.40–0.73)**	0.73 (0.50–1.07)	**0.72 (0.58–0.90)**

OR, odds ratios; CI, confidence intervals. Significant results ($P < 0.05$) are in bold.
ORs were adjusted for gender, age, cohabitation status, having children, smoking in previous 4 weeks, physically active in sports, positive life-events and perceived social support.

were significantly predicted by flourishing (OR = 0.66, 95% CI = 0.45–0.97, $P = 0.036$), high hedonic well-being (OR = 0.62, 95% CI = 0.43–0.91, $P = 0.015$) and high eudaimonic well-being (OR = 0.68, 95% CI = 0.46–0.99, $P = 0.042$), although with wide confidence intervals.

Discussion

Our findings provide unique longitudinal evidence for the hypothesis that mental well-being predicts first-incidence and recurrent mental disorders in the general population. Flourishing mental health played a protective role in the development of any mood, anxiety and DSM-IV disorder 3 years later, although flourishing did not significantly predict any substance use disorder. Similar results were found for either high hedonic and high eudaimonic well-being as predictor of mental illness.

The 'two continua model' of mental health[6] claims that mental well-being and mental illness are related yet present two distinct continua. So, people with a mental disorder can also possess high levels of happiness[27] or flourishing mental health,[9,12] and people with low mental well-being are not automatically diagnosed with a mental disorder.[9,12,27] Numerous studies have provided evidence for this model, for example by demonstrating a different pattern of social and psychological factors associated with mental well-being than with mental health problems[25] and by revealing a bidirectional relationship between mental well-being and mental illness.[14] The present study underscores the importance of promoting mental well-being and protecting flourishing mental health in the general population besides alleviating mental suffering.[12]

Comparison with previous research

Our results corroborate with prior studies investigating the longitudinal relationship between mental well-being and mental disorders. Two of these studies were also conducted in a national representative

adult sample. The first study assessed diagnostic criteria for major depression, generalized anxiety disorder and panic disorder in people aged 25–74 and investigated the change in mental well-being categories (e.g. improved from languishing to moderate mental health, declined from flourishing to moderate mental health, stayed flourishing) between 1995 and 2005.[9] The other study assessed mental well-being and psychopathological symptoms on continuous scales, at 4 measurement times during 9 months (2007–08) in people aged 18 and above.[14] Both studies demonstrated that the level of mental well-being significantly predicted mental illness later in time.[9,14] Two other non-representative longitudinal studies showed that the absence of high well-being increased the risk for depression.[13,15] Taken together, emerging longitudinal evidence emphasize the possibility of preventing mental illness by improving mental well-being.

The present study is the first to examine the longitudinal relationship between mental well-being and substance use disorders. High hedonic well-being preceded the reduced risk for any substance use disorder, although this was a marginal significant result which became stronger—and led to significant results for all mental well-being categories—when positive life-events and social support were not included in the regression models. This suggests that the non-significant results for substance use disorders might be explained by intercorrelations between positive life-events, social support and mental well-being. The few prior studies using Keyes' classification model in studying substance use disorders, showed contradicting results. For example, Low et al.[28] found no significant cross-sectional association between alcohol consumption and flourishing in undergraduates, while other studies showed that flourishing was related to lower prevalence rates of alcohol dependence in a representative US sample[29] and to be 'abstinent for the past 30 days' in people who had attended treatment.[30] Overall, our results seem most in line with a representative twin study wherein the genetic risk factors between mental well-being and internalizing

psychopathology (e.g. mood disorders) were stronger related than that for externalizing psychopathology (e.g. alcohol problems).[31] More research is needed to examine temporal associations between mental well-being and substance use disorders and the influence of positive life-events and social support on this relationship.

Strengths and limitations

The main strengths of our study comprises its longitudinal design and large national representative adult sample, the 3-year interval rather than a relatively short gap of 3 months during 9 or 12 months[13,14] or a relatively long gap of 10 years,[9,15] and the diagnostic interview for assessing mental disorders as well as mental well-being categories. Some limitations also apply which should be considered when interpreting our results. First, the incidence rates are based on self-reported lifetime disorders at T0 and 3-year mental disorders at T1 and T2. Especially the self-reported lifetime disorders could have been biased by inaccurate recall, which might have overestimated the reported incidence rates.[32] Second, we were forced to use categories of mental disorders due to the relatively low level of incidence rates of the separate disorders on population level. The same applies to the categories of mental well-being since the proportion of languishing mental health was too low to draw any firm conclusions. Third, cohort studies like ours are generally limited by sample attrition at follow-up.

Public health implications

This study provides further support for the importance of promoting mental well-being from a public mental health and clinical perspective as has been acknowledged by the World Health Organization[7] and by recent calls for broadening the scope of psychiatry[33] and clinical psychology[34] to regain a more balanced focus on 'the positive' alongside alleviating mental suffering. There is initial evidence that flourishing can be successfully promoted[35,36] but more studies are needed. The current study suggests that flourishing mental health seems a more important predictor of mental disorders than either high hedonic or high eudaimonic well-being because of the similarity in decreased odds ratios and the fact that flourishing captures both feeling happy and functioning well in connection with themselves, others and society. Especially in countries like The Netherlands where the majority of citizens already exhibit high levels of hedonic well-being,[22,37,38] it might be more rewarding to measure and enhance flourishing in the general population rather than either measuring and improving subjective well-being or psychological well-being which now predominates in the literature.[5,38,39] Moreover, an innovative and new strategy for mental health promotion might be to encourage people in wealthy nations like The Netherlands to pursuit a flourishing mental health status by including aspects of hedonic well-being such as savouring positive emotions, as well as aspects of eudaimonic well-being such as the use of character strengths in new ways or expressing gratitude to a loved one. Our findings indicate that such a strategy may help ameliorate the incidence and associated burden of mood and anxiety disorders in the general population.

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Key points

- Flourishing as well as either high hedonic and high eudaimonic well-being significantly reduced the risk of developing any mood and anxiety disorder up to 57%.
- Mental well-being did not significantly predicted first-incident and recurrent substance use disorders.
- The findings emphasize the need to promote mental well-being in the general population by interventions improving positive functioning rather than alleviating mental suffering.
- Economic and epidemiological research should expand hedonic well-being measures with eudaimonic well-being measures to guide public health policy.

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