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Positive Psychiatry Interventions in Geriatric Mental Health

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Abstract:	<p>Purpose of review: Positive psychiatry shifts the focus of geriatric mental healthcare beyond studying disorders and psychopathology to studying factors that contribute to mental well-being and successful aging. An increasing number of interventional studies are using treatments that target modifiable positive psychosocial characteristics (PPCs) and study their impact on mental health. Here we provide an overview of the literature on positive psychiatry interventions using illustrative examples of interventions targeting social connectedness, meaning in life, wisdom, and resilience.</p> <p>Recent findings: There is growing evidence that PPCs are modifiable constructs that may be associated with improved well-being, physical health, and mental health outcomes.</p> <p>Summary: The preliminary evidence summarized in this narrative review indicates that positive psychiatry interventions targeting social connectedness, meaning in life, wisdom, and resilience can improve overall well-being and other positive health outcomes amongst older adults. The effect sizes of these interventions reported in RCTs and meta-analyses are typically small to medium, but occasionally large effect sizes are also reported. Current literature is restricted by heterogeneous methodology, limiting clinicians' abilities to extrapolate these principles of positive psychiatry into everyday practice. With the expanding body of evidence, positive psychiatry may have the potential to transform the landscape of geriatric mental health.</p>

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1

POSITIVE PSYCHIATRY INTERVENTIONS IN GERIATRIC MENTAL HEALTH

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Abstract

Purpose of review: Positive psychiatry shifts the focus of geriatric mental healthcare beyond studying disorders and psychopathology to studying factors that contribute to mental well-being and successful aging. An increasing number of interventional studies are using treatments that target modifiable positive psychosocial characteristics (PPCs) and study their impact on mental health. Here we provide an overview of the literature on positive psychiatry interventions using illustrative examples of interventions targeting social connectedness, meaning in life, wisdom, and resilience.

Recent findings: There is growing evidence that PPCs are modifiable constructs that may be associated with improved well-being, physical health, and mental health outcomes.

Summary: The preliminary evidence summarized in this narrative review indicates that positive psychiatry interventions targeting social connectedness, meaning in life, wisdom, and resilience can improve overall well-being and other positive health outcomes amongst older adults. The effect sizes of these interventions reported in RCTs and meta-analyses are typically small to medium, but occasionally large effect sizes are also reported. Current literature is restricted by heterogeneous methodology, limiting clinicians' abilities to extrapolate these principles of positive psychiatry into everyday practice. With the expanding body of evidence, positive psychiatry may have the potential to transform the landscape of geriatric mental health.

Keywords: successful aging; resilience; wisdom; meaning in life; spirituality; compassion; social engagement

Introduction

With the global trend of decreasing birth rates and increasing life expectancy, caring for the physical and mental health of an increasingly older population has become a public health challenge. In particular, the current healthcare system appears ill-equipped to cope with the rising burden of psychiatric disorders in older populations [1]. From a provider perspective, there is a substantial dearth of professionals needed to diagnose and treat mental illness amongst older adults. From a patient perspective, older adults are less likely to utilize mental health resources and receive adequate care [2]. Given these growing challenges, there is an impetus to reconsider the current framework of providing mental healthcare to older adults.

Positive psychiatry has gained substantial momentum in the field of geriatric psychiatry in recent years [3]. Historically, psychiatry has focused on the diagnosis and treatment of individuals with psychopathology and has excluded or ignored the study of factors contributing to mental well-being beyond the absence of disease; positive psychiatry aims to remedy this state of affairs. Positive psychiatry is the science and practice of psychiatry that seeks to understand and promote well-being through assessment and interventions improving positive psychosocial characteristics (PPCs) in people who suffer from or are at high risk of developing mental or physical disorders [4]. Positive psychiatry aims to target and enhance PPCs to improve well-being as well as mental health outcomes [4, 5]. In geriatric psychiatry, positive psychiatry also fits in with the notion of successful aging [6]. Successful aging as a concept that emerged in the late 20th century to better understand older adult individuals who were able to preserve the following characteristics: 1) freedom from disease and disability, 2) high mental and physical capacities, and 3) social and productive engagement [7].

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4 Historically, positive psychiatry can be seen as the psychiatric offshoot of the positive
5
6 psychology movement pioneered by Seligman and colleagues in the late 1990s [8]. Just as
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8 clinical psychology and psychiatry are over-lapping professions, positive psychology and
9
10 positive psychiatry also have over-lapping concepts and goals, with differences arising from
11
12 unique training backgrounds of providers, patient populations, and treatment approaches.
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14
15 Positive psychiatry is a branch of medicine with a focus on individuals with medical disorders,
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17 psychiatric disorders, biological interventions (i.e., transcranial magnetic stimulation, deep brain
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19 stimulation, neuropsychotropics), and the neurobiological foundations of PPCs. Despite these
20
21 differences, there are no strict distinction between ‘positive psychology interventions’ and
22
23 ‘positive psychiatry interventions’ since interventions targeting PPCs can be studied in the
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25 general population as well as individuals with medical and psychiatric disorders. Figure 1
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32 outlines some salient commonalities and differences between the two fields.

33
34 Although aging may be associated with challenges such as loss of monetary and social
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36 resources and deteriorating functional and cognitive abilities, aging may also be associated with
37
38 benefits, such as increases in spirituality, wisdom, emotional regulation, and problem-solving
39
40 abilities. These increases in PPCs may explain the “paradox of aging,” or the tendency for
41
42 subjective well-being to increase despite the challenges associated with age [9]. A growing body
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44 of literature suggests PPCs are associated with numerous favorable physical and mental health
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46 outcomes.
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51 An increasing number of interventional studies are using treatments that target modifiable
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53 PPCs and study their impact on mental health. For the purpose of this narrative review, a
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55 literature search for pertinent articles was conducted using various combinations of key words
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57 (social connectedness, meaning in life, wisdom, resilience AND older adults) and utilizing the
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4 databases PubMed, PsycINFO, and Google Scholar, with the goal of identifying randomized
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6 controlled trials (RCTs) of selected interventions targeting PPCs and systematic reviews/meta-
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8 analyses of these RCTs. Where available, we focused on studies conducted in psychiatric
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10 populations, but we did not exclude studies conducted in the general population. Articles
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12 identified through the online search were subsequently hand searched and reviewed individually
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14 for further references of significance. We provide an initial overview of the literature on positive
15
16 psychology interventions followed by a discussion of interventions targeting social
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18 connectedness, meaning in life, wisdom, and resilience as illustrative examples of contemporary
19
20 research in positive psychiatry and geriatric mental health.
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25 26 **Results**

27 28 **Positive Psychology/Psychiatry Interventions**

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30 Positive Psychology/Psychiatry Interventions (PPIs) are a broad category of treatment
31
32 methods and intentional activities that aim to increase well-being by cultivating positive feelings,
33
34 behaviors, or cognitions [10]. The focus of these interventions is to build strengths and positive
35
36 attributes (such as optimism) rather than fixing or remedying negative attributes (such as
37
38 correcting cognitive distortions). PPIs are designed using the principles of positive psychology as
39
40 outlined by the seminal work of Seligman and Csikszentmihaly [8]. PPIs have been studied in
41
42 healthy, non-clinical samples as well as in clinical samples such as in individuals with depression
43
44 [10]. PPIs differ from traditional psychological and psychiatric interventions in that they do not
45
46 focus on aiming to reduce symptoms, problems, or disorders, rather, they focus on promoting
47
48 well-being. Furthermore, PPIs typically focus on short, tangible tasks such as writing down three
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50 good things each day or savoring a moment for two minutes with the goal of increasing positive
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4 emotions. The outcomes measured in PPIs vary broadly, but studies attempt to measure and
5
6 improve optimism, happiness, or psychological-well-being [10].
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9 Overall, the published PPI studies have found small but significant effects on well-being
10 and depressive symptoms, though few of these interventions targeted older adults. A 2013 meta-
11 analysis of PPIs identified 39 studies with a total of 6,139 participants [11]. This study showed
12
13 that PPIs had small but significant effect sizes, with standardized mean difference (SMD) of 0.34
14
15 (95% CI: 0.22, 0.45) for subjective well-being and 0.23 (95% CI: 0.09, 0.38) for depressive
16
17 symptoms, when compared to the control group. However, only a few PPIs have examined
18
19 clinical populations such as suicidal inpatients [12], individuals with tobacco use disorder [13],
20
21 and individuals with schizophrenia [14]. Additionally, only two of the 39 studies examined in the
22
23 meta-analysis targeted older adults [15, 16].
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31 Examining PPIs specifically focusing on older adults, a 2017 systematic review identified
32 eight interventions targeting well-being in older adults [17], including seven interventions not
33 included in the 2013 meta-analysis described above. These interventions included exercises such
34 as reminiscence [18-21], gratitude [22], forgiveness, optimism, savoring positive experiences,
35 curiosity, and multicomponent interventions [23, 24]. PPIs were associated with significant
36 improvements in well-being and alleviated depressive symptoms in these studies, and the authors
37 noted gratitude interventions were maximally effective in promoting durable well-being for
38 healthy older adults [17].
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50 Other notable PPIs targeted at older adults have attempted to identify the individual
51 effects of “positive” exercises such as listing three good things each day, listing three funny
52 things each day, conducting a gratitude visit, and using “signature strengths” by creating multiple
53 intervention arms in an online setting [25]. Other investigators have demonstrated beneficial
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4 effects for 8-week group-based positive psychology classes in community-based settings [26,
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7 27]. While positive psychology interventions have diverse intervention characteristics, many of
8
9 the interventions to date have demonstrated positive small to medium effect sizes.

11 **Social Connectedness**

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13
14 Loneliness and social isolation have emerged as major health risk factors in the United
15
16 States. While the terms social isolation and loneliness are commonly used interchangeably in
17
18 everyday language, research generally indicates that social isolation describes an *objective*
19
20 absence of connection whereas loneliness is the *subjective* state of feeling socially isolated [28].
21
22 Many of the interventional literature focuses on loneliness, and the UCLA Loneliness scale is the
23
24 most commonly employed scale in clinical research studies [29]. Other scales include single item
25
26 measures and the de Jong Gierveld Scale [30], which was designed specifically to measure
27
28 loneliness in older adults. Social isolation measures include social network characteristics, social
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30 interaction, and participation in social activities[31].
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36 Older populations are particularly vulnerable to feelings of loneliness and social isolation.
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38 Large survey data indicates the prevalence of loneliness *or* social isolation to be 22% and 23%
39
40 amongst adults over 65 in the United States and United Kingdom, respectively [32]. Estimates of
41
42 the prevalence of severe loneliness are 5-15% [33, 34]. One qualitative research study found that
43
44 older adult participants had more feelings of loneliness compared to their recalled feelings of
45
46 loneliness 10 years prior, indicating an underestimation of future feelings of loneliness [35].
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50 Loneliness and social isolation are associated with worse physical and mental health
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52 outcomes [36]. Most notably, loneliness is independently associated with depression [37] and all-
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54 cause mortality [38]. While there is an abundance of cross-sectional studies, the longitudinal data
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56 are limited, impacting causal inferences. One longitudinal survey found increasing loneliness
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4 was independently associated with changes in marital status, living arrangements, social
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6 networks, and physical health [34].
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9 **Social Connectedness Interventions**

10
11 An increasing number of interventions for loneliness and social isolation have been
12
13 developed in recent years. In one of the first quantitative analyses of these interventions, a 2011
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15 meta-analysis identified 20 RCTs with a mean effect size of Hedges $g = -0.198$ (95% CI: -0.32 ,
16
17 -0.08) in reducing loneliness, with a moderator analysis demonstrating larger mean effect sizes
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19 in interventions addressing maladaptive social cognition compared to those addressing social
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21 support, increasing opportunities for social access, or improving social skills [39]. Within these
22
23 20 RCTs, 10 studies targeted individuals 60 years or older [39].
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28 There have also been numerous reviews on social connectedness interventions in older
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30 adults [40]. A 2019 umbrella review of identified 16 reviews and 19 RCTs [41], finding an
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32 overall pooled effect size of -0.14 (-0.37 , 0.09), indicating a non-significant decrease in
33
34 loneliness. The review categorized the selected interventions into four categories, including
35
36 enhancing social support ($n = 9$), increasing opportunities for social access ($n = 7$), improving
37
38 social skills ($n = 2$), and addressing maladaptive social cognition ($n = 1$). These interventions
39
40 were mostly studied in trial durations of 5-8 weeks, although three interventions lasted on the
41
42 scale of 1-3 years. There were 6 internet-based “e-Interventions” and 8 group-based
43
44 interventions. There was significant diversity amongst intervention designs, with interventions
45
46 ranging from group-based friendship clubs and daycare programs to using videoconferencing
47
48 and technology to network with others [41]. Other interventions were therapy-driven, with the
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50 theoretical premise that loneliness is a modifiable trait. The heterogeneity of intervention designs
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52 and frameworks makes it difficult to find the common characteristics of interventions that may
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4 positively impact social connectedness amongst older adults [42]. Overall, social connectedness
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6 interventions have been extensively reviewed amongst healthy older adults, with multiple
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8 reviews demonstrating mixed results [41, 43-45].
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10 11 **Meaning in Life (MiL)** 12

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14 Contrary to philosophical discussions of meaning *of* life, meaning in life (MiL) is the
15
16 psychological perception of an individual regarding one's own life and activities, and the value
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18 and importance ascribed to them, and the degree to which they generate a sense of
19
20 meaningfulness or purpose [46]. MiL has received increasing attention in positive psychiatry as
21
22 well as medicine at large. A 2012 review reported the presence of 59 validated instruments
23
24 developed with the goal of measuring MiL for scientific study [46]. Commonly measured aspects
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26 of MiL include the presence of MiL, search for MiL, and sources of MiL.
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31 Multiple research studies have demonstrated a strong link between MiL and better
32
33 physical, mental, and overall health outcomes [47, 48], including in older adult populations [49]
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35 and individuals with Alzheimer's disease [50] as well as in community samples across the entire
36
37 adult lifespan [51]. Longitudinal studies in college students have also demonstrated that MiL
38
39 may be a protective factor against suicide [52].
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43 A recent study reported that the presence of MiL showed an inverted U-shaped pattern
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45 across the lifespan, peaking around the age of 60 and decreasing subsequently as physical health
46
47 declines with age [51]. This underscores the importance of MiL interventions in older adults, as
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49 well as near the end of life in oncologic and palliative care populations.
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53 **Meaning in Life Interventions** 54

55 Overall, the published MiL interventions have demonstrated a significant effect on
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57 overall well-being. A recent realist and meta-narrative evidence synthesis described nine
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4 interventions with the goal of enhancing MiL among patients with advanced diseases. The
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6 interventions ranged in length from 2 to 8 sessions of 30-90 minutes each [53]. The mean age of
7
8 participants in these intervention studies ranged from 54 to 65 years. Most interventions utilized
9
10 individual sessions with a trained therapist, while one intervention was in a group setting. The
11
12 interventions employed various theoretical models, with the most common being Viktor Frankl's
13
14 logotherapy [54]. Other frameworks explored topics such as sources of meaning, life priorities,
15
16 and gratitude for life lived [53]. Another recent meta-analysis quantified meaning-centered
17
18 interventions in a terminal cancer population, finding five meaning-focused RCTs had a
19
20 weighted effect size of d of 0.46 (95% CI: 0.33, 0.58) for the pooled outcomes (meaning of life,
21
22 spiritual well-being, quality of life, anxiety, and physical symptoms), with an effect size of d of
23
24 0.96 (95% CI: 0.64, 1.28) for the meaning of life outcome for MiL intervention compared to
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26 control [55].
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34 Another commonly studied type of MiL interventions in older adult populations are life
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36 review interventions, which are individual or group storytelling interventions with a focus on
37
38 integrating life stories through different phases in life [56]. These interventions have a
39
40 demonstrable impact and are effective in enhancing MiL as well as other mental health outcomes
41
42 in older adults [57]. A meta-analysis demonstrated that life review interventions had an effect
43
44 size of d of 0.84 (95% CI: 0.31, 1.37) on depressive symptomatology in older adults [58], and d
45
46 of 0.54 (95% CI: 0.33, 0.75) on measures of psychological well-being in older adults [59], with
47
48 more recent studies finding similar effects for life review interventions in patients with dementia
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50 [60]. Overall, MiL interventions demonstrate medium to large effect sizes, although much of the
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52 literature is limited to those at the end of life.
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57 **Wisdom**

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4 Although 'wisdom' is often used in everyday language and has origins stemming back to
5
6 ancient times, it has been an elusive construct to define in the psychological literature with
7
8 empirical studies starting in the 1970s. Bates and Smith (1990), pioneers in the field, defined
9
10 wisdom as "expert knowledge in the fundamental pragmatics of life" [61]. While wisdom is
11
12 related to knowledge, wisdom is commonly understood as the practical use, application, and
13
14 integration of knowledge [62]. A foundational 2010 study, aiming to find consensus amongst
15
16 expert researchers in the field, summarizes wisdom as "a learned, advanced form of cognitive
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18 and emotional development that is experience driven"[63].
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24 A 2013 review identified that a majority of the definitions of wisdom in the peer
25
26 reviewed literature contained the following five subcomponents: 1) knowledge of life, 2)
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28 prosocial attitudes and behaviors, 3) self-understanding, 4) acknowledgment of uncertainty, and
29
30 5) emotional homeostasis. This review also identified five wisdom self-reported questionnaires
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32 and four instruments using interview-based instruments scored by trained raters [64]. Given their
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34 ease of use, self-reported questionnaires have been more commonly used for assessment. One of
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36 the more widely used scales is the Three-Dimensional Wisdom Scale, given its rigorous
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38 development and good psychometric properties [65].
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44 Across the lifespan, wisdom is associated with positive outcomes including better overall
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46 physical and mental health [66], happiness [67], and lower levels of loneliness [68]. Amongst
47
48 older adults, numerous investigations using self-reported wisdom scales have demonstrated
49
50 wisdom is positively associated with life satisfaction [69, 70] and subjective well-being [69, 71],
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52 with one longitudinal study reporting that wisdom ameliorates the effect of adverse life
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54 circumstances on subjective well-being [72]. However, some studies using the Berlin Wisdom
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56 model, an interview-based scoring system, found that wisdom and subjective well-being were
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4 unrelated [73, 74]. Despite some contradictory results, on whole, wisdom seems to be associated
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6 with numerous psychosocial advantages to those who score high in the trait.
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9 Although there is a common perception that wisdom increases with age, some empirical
10
11 evidence indicates that wisdom has a curvilinear relationship with age, peaking in the middle of
12
13 life [66]. This underscores the importance of wisdom interventions in all ages of life.
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15 16 **Wisdom Interventions**

17
18 Given the broad definition, it has been difficult to integrate all interventions targeting
19
20 wisdom and its associated constructs. To date, there has been one meta-analysis of wisdom
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22 interventions, or interventions that target components of wisdom. This meta-analysis identified
23
24 57 studies that addressed some component of wisdom: 29 focused on prosocial behavior, 13 on
25
26 emotional regulation, and 15 on spirituality. There was considerable heterogeneity for
27
28 populations targeted, scales use, and interventional characteristics. This meta-analysis revealed a
29
30 pooled SMD of 0.43 (95% CI: 0.22, 0.30) for pro-social behavior, 0.67 (95% CI: 0.21,1.12) for
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32 emotional regulation, and 1.00 (95% CI: 0.41 to 1.60) for spirituality interventions, respectively
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34 [75].
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41 While none of the interventions reviewed in this meta-analysis were specifically targeted
42
43 toward older adults, seven of the interventions had mean ages above 50. Out of these
44
45 interventions, two focused on self-compassion [76, 77] and five focused on spirituality [78-82].
46
47 Both a high intensity eight-week group-based self-compassion therapy intervention [76] and a
48
49 self-help intervention with seven self-compassion lessons and email guidance demonstrated
50
51 favorable self-rated self-compassion and well-being compared to control [77]. The five
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53 spirituality interventions with sample mean ages over 50 also demonstrated significant
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55 improvements in spirituality [75]. While wisdom is a growing topic of interest in older adults, to
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4 date, few interventions directly target wisdom or its related constructs as an outcome. Moreover,
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6 the interventions to date have not targeting psychiatric clinical population.
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9 **Resilience**

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11 In everyday language, resilience is a term used to describe one who can recover, or
12
13 “bounce back” from difficult situations. In the psychological literature, a commonly cited
14
15 definition of resilience is the definition by the American Psychological Association (APA): “The
16
17 process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources
18
19 of stress” [83]. Consistent with this definition, recent literature conceptualizes resilience as an
20
21 adaptable resource that can be learned, rather than a static personality trait [84]. Numerous scales
22
23 have been developed to measure resilience, but researchers have yet to adopt one scale as a ‘gold
24
25 standard’ [85].
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31 To date, many resilience interventions have targeted specific groups such as military and
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33 healthcare workers, but there is a growing literature focusing on resilience in older adults [86].
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35 Resilience amongst older adults is hypothesized to moderate the effect of the numerous stressors
36
37 associated with aging such as worsening health, bereavement, decline in socioeconomic status,
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39 disability, loss of autonomy, and depression, all of which may negatively impact overall well-
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41 being [85, 87].
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46 In a study of 2,025 U.S. veterans over the age of 60, 70% of those with a high number of
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48 lifetime traumas were found to be resilient. This study demonstrated resilience was associated
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50 with the characteristics of higher educational attainment, marriage, emotional stability, social
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52 connectedness, community integration, and purpose in life [88]. Other cross-sectional studies
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54 examining resilience in older adults suggest resilience is associated with numerous positive
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56 physical, mental, and social health outcomes [86]. Most notably, higher resilience is associated
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4 with independence in activities of daily living [89], decreases in all-cause mortality [90], lower
5 rates of depression [91] , and social connection [92].
6
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8 9 **Resilience Interventions**

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11 Despite numerous cross-sectional studies, interventions specifically targeting resilience
12 as an outcome is limited. To date, three systematic reviews [93-95] and one systematic review
13 protocol published [96] have analyzed the efficacy of resilience interventions in all populations.
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15 One of the most rigorous reviews, which only included interventions utilizing three valid and
16 reliable measures of psychological resilience, reported a positive effect size of SMD of 0.44
17 (95% CI: 0.23 to 0.64) [94]. These interventions vary widely and include mindfulness training,
18 cognitive behavioral therapy sessions, online webinars, and phone coaching [94]. A recent 2018
19 review explains the limitations of the resilience literature, citing major methodological problems,
20 heterogeneity in resilience definitions, and poor reporting quality, amongst other conceptual
21 challenges [97].
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36 A 2014 book by Helen Lavretsky about resilience and aging reviews numerous
37 interventions believed to improve resilience in older populations, but it is important to note that
38 these interventions described target outcomes *related* to resilience or that have theoretical links
39 to resilience, such as well-being therapy, social support, lifestyle, mind-body, and exercise
40 interventions [98], which we have described in other sections of this manuscript.
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48 We identified two interventions designed to enhance resilience amongst older adults. The
49 first intervention used the validated Connor-Davidson Resilience Scale [99] to examine the
50 effects of a three-session group-based intervention aimed at 1) recognizing aging as an
51 opportunity for continued growth and enjoyment, 2) increasing positive emotions, and 3)
52 engaging in values-driven activities [100]. This study demonstrated significant changes in
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4 resilience from pre-intervention to 3-month follow up. Another resilience intervention recruited
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6 older adults with chronic illness (heart conditions, diabetes, and arthritis) for six group-based
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8 sessions to share lived experiences, relaxation techniques, management of stress, and coping
9
10 strategies. The trial found significant increases in perceived resilience, defined by the authors as
11
12 a composite between self-efficacy, social support, and overall well-being at the end of the course
13
14 and at three-month follow-up [101]. Given the limited number of interventions, it remains to be
15
16 determined whether resilience can be operationalized and taught to individuals in an attempt to
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18 buffer life stressors. Neither of these two interventions focused on clinical psychiatric
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20 populations.
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26 A summary table of meta-analyses for select PPCs in older adults is summarized in Table
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28 1. Selected randomized controlled trials (RCTs) for PPC interventions are summarized in Table
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31 2.
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33 **Discussion**

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36 There is growing evidence that PPCs are associated with well-being and successful aging.
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38 The current evidence demonstrates it is possible to modify PPCs, and there is preliminary
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40 evidence to suggest that PPC enhancement can increase overall well-being.
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44 PPIs improve well-being and are supported by multiple RCTs, systematic reviews, and
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46 meta-analyses. However, the generalizability of these analyses is limited by the heterogeneity in
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48 construct definitions, measurements, and diversity of intervention characteristics. Studies in the
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50 geriatric population are relatively limited in number, and primarily focus on healthy older adults,
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52 as opposed to clinical populations. Moreover, it is important to note our search methodology
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54 utilized disease-focused databases, meaning this review likely underestimates the number of
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56 interventions targeted toward general populations. This review reveals the relative paucity of
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4 research studies of interventions targeting PPCs in psychiatric subjects, and hence the
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6 generalizability of the current body of literature to psychiatric subjects is uncertain. Future
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8 research should focus on studying these interventions in clinical populations, including those
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10 with cognitive impairment, frailty, or psychiatric conditions.
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14 It should also be noted this review artificially creates distinctions between PPCs such as
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16 meaning in life, resilience, and social connectedness to better outline the available literature;
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18 however, PPCs are highly overlapping and correlated constructs. For example, MiL is likely
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20 linked to resilience and wisdom, and an intervention on the former may also affect the latter two,
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22 and *vice versa*. Additionally, exercise, nutrition, and mind-body interventions likely influence
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24 many of these PPCs; however, this review did not capture these interventions as many of these
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26 studies have not examined the direct link between these interventions and PPCs or explicitly
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28 hypothesize a relationship between their intervention and PPCs. Understanding these complex
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30 relationships is one of the tasks of on-going and future research in positive psychiatry.
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36 In conclusion, our findings suggest that interventions aimed at promoting PPCs have the
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38 potential to improve overall well-being and other positive health outcomes amongst older adults.
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40 While an increasing number of clinicians are recognizing the importance of positive psychiatry
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42 principles, the current literature is restricted by heterogeneous methodology, limiting clinicians'
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44 abilities to extrapolate these principles of positive psychiatry into everyday practice. With the
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46 rapidly expanding body of evidence, positive psychiatry may have the potential to transform the
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48 landscape of geriatric mental health in coming years.
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53 **Compliance with Ethical Standards**

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55 **Conflict of Interest**

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58 The authors declare no conflict of interest.
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Human and Animal Rights and Informed Consent

This article does not contain any studies with human or animal subjects performed by any of the authors.

Appendix A: Glossary of Key Terms

Meaning in Life – A positive characteristic reflecting an individual’s perception of life and activities, the value and importance ascribed to them, and the degree to which they generate a sense of meaningfulness or purpose [46].

Positive Psychiatry - A branch of medicine and psychiatry that seeks to understand and promote well-being through assessment and interventions improving positive psychosocial characteristics in individuals who suffer from or are at high risk of developing mental or physical disorders [4].

Positive Psychology – A branch of psychology that seeks to achieve scientific understanding of positive human functioning and develop interventions to enhance well-being and flourishing in individuals, families, and communities.

Positive Psychology and Positive Psychiatry Interventions – Scientific interventions and designed activities that aim to increase well-being by cultivating positive feelings, behaviors, or cognitions [10].

Social Connectedness – A positive characteristic measuring the degree to which an individual has close meaningful, and constructive relationships with others. The opposite of loneliness (subjective distress arising from discrepancy between desired and perceived social relationships) and social isolation (objective absence of social contacts).

Resilience - A positive characteristic measuring the degree to which an individual can adapt well in the face of adversity, trauma, tragedy, threats, or significant sources of stress [83].

Wisdom - A positive grouping of characteristics within an individual that includes an having 1) knowledge of life and social advising, 2) prosocial attitudes and behaviors (e.g., empathy, compassion, altruism), 3) self-understanding, 4) acceptance of uncertainty and divergent values, 5) emotional regulation, and 6) decisiveness [64].

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Important Studies *

*17. Sutipan P, Intarakamhang U, Macaskill A. The impact of positive psychological interventions on well-being in healthy elderly people. *Journal of Happiness Studies*. 2017;18(1):269-91.

A good review of positive psychology interventions amongst older adults.

* 53. Guerrero-Torrelles M, Monforte-Royo C, Rodríguez-Prat A, Porta-Sales J, Balaguer A. Understanding meaning in life interventions in patients with advanced disease: a systematic review and realist synthesis. *Palliative medicine*. 2017;31(9):798-813.

A good systematic review of meaning in life interventions in patients with advanced disease

*90. Robertson IT, Cooper CL, Sarkar M, Curran T. Resilience training in the workplace from 2003 to 2014: A systematic review. *Journal of Occupational and Organizational Psychology*. 2015;88(3):533-62.

Up to date systemic review and meta-analysis of resilience interventions measuring psychological resilience for all populations.

*41. Jarvis M-A, Padmanabhanunni A, Balakrishna Y, Chipps J. The effectiveness of interventions addressing loneliness in older persons: An umbrella review. *International Journal of Africa Nursing Sciences*. 2019:100177.

A comprehensive umbrella review summarizing many systemic reviews, meta-analyses, and randomized controlled trial loneliness interventions targeting older adults.

* 42. Gardiner C, Geldenhuys G, Gott M. Interventions to reduce social isolation and loneliness among older people: An integrative review. *Health & Social care in the Community*. 2018;26(2):147-57.

A recent review summarizing approaches of previous social isolation interventions targeting older adults.

* 75. Lee EE, Bangen KJ, Avanzino JA, Hou B, Ramsey M, Eglit G et al. Meta-analysis of Randomized Controlled Trials to Enhance Components of Wisdom: Pro-social Behaviors, Emotional Regulation, and Spirituality. *JAMA Psychiatry*. (in press)

Up to date meta-analysis of wisdom interventions for all populations.

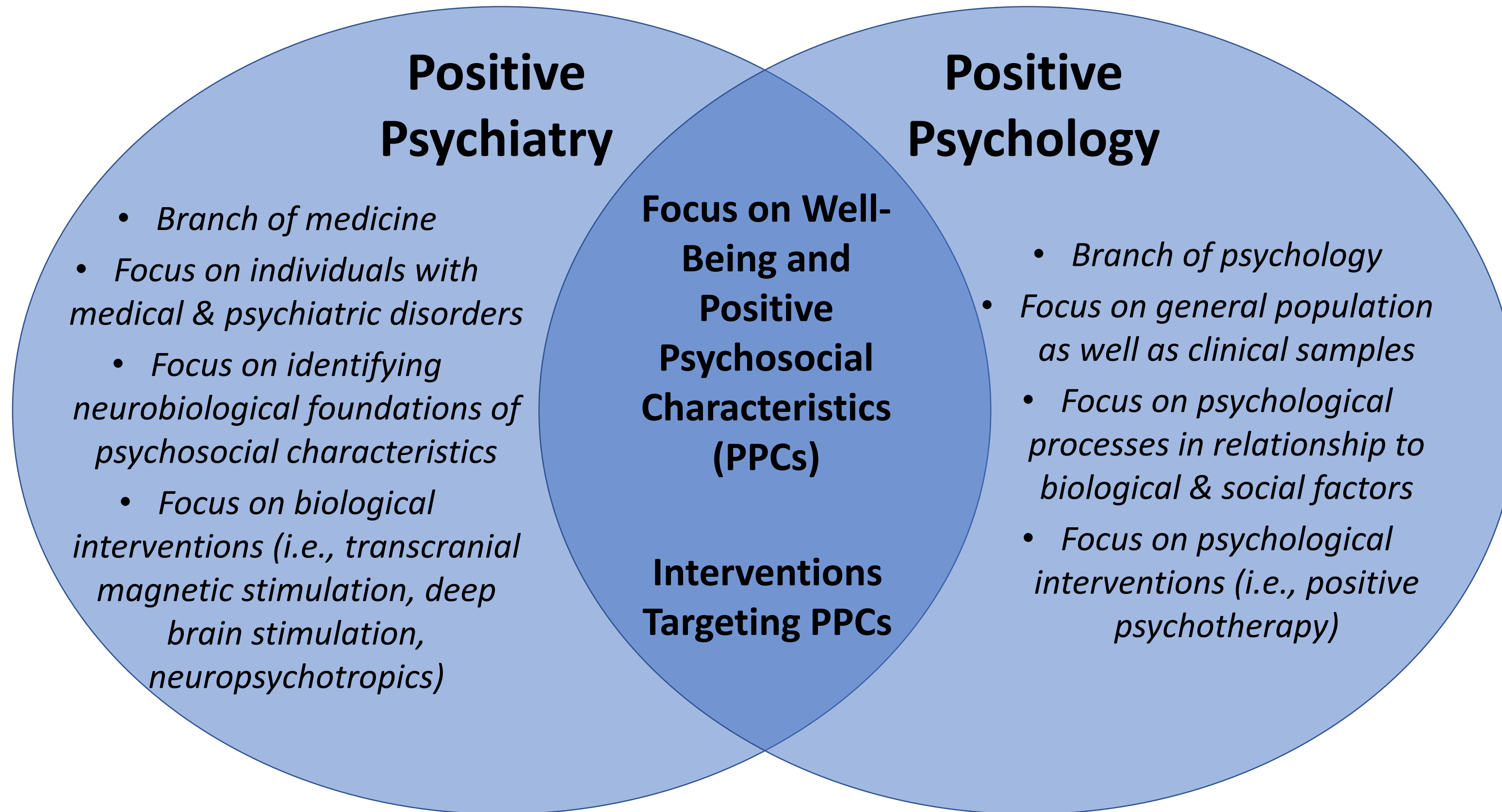


Table 1: Meta-Analyses of Positive Psychiatry Interventions Targeting Meaning in Life and Social Connectedness

	Recent Reviews	Inclusion Criteria	Number of RCTs Included in Review	Effect Size (95% Confidence Interval) compared to control	Outcome Measures
Social Connectedness	Jarvis et al., 2019 [41]	Umbrella review of social connectedness identifying 19 RCTs	19	0.14 (-0.09, 0.37)	Pooled effect size across multiple measures
Meaning in Life	Kang et al., 2019 [55]	Meaning-centered interventions for terminal or advanced cancer patients	5	0.46 (0.33, 0.58)	Pooled effect size across multiple measures
	Wang et al., 2017 [57]	Life review interventions for terminal or advanced cancer patients	8	0.35 (0.15, 0.56)	Overall Quality of Life
	Bohlmeijer et al., 2007 [59]	Life review interventions in older adults	15	0.54 (0.33, 0.75)	Psychological Well-being

Notes: RCT = Randomized Controlled Trial
 Positive effect sizes indicate beneficial results

Table 2: Illustrative Examples of RCTs of Positive Psychiatry Interventions Characteristics

	Design	Age / Population	Primary Outcome Measures	Experimental Intervention
Positive Psychology Interventions				
Ramirez et al., 2014 (Spain) [24]	Pre- post- RCT design with experimental (n = 26) vs. active control group (n = 20)	Community population (mean age = 71)	<ul style="list-style-type: none"> - Anxiety - Depression - Subjective happiness - Life satisfaction - Memory (specific and general) 	Nine 90-minute weekly sessions with positive psychology, forgiveness, gratitude, and life review exercises
Killen, A., & Macaskill, A. (2015). (United Kingdom) [22]	Pre- post- RCT with online (n = 48) vs. paper group (n = 40)	Community population (mean age = 71)	<ul style="list-style-type: none"> - Gratitude - Flourishing - Satisfaction with life - Positive and negative experiences - Perceived stress - Health-related quality of life 	Two weeks of typing or writing down three positive events during each intervention day
Proyer et al., 2014 (Online) [25]	Pre- post- RCT with multiple intervention arms including gratitude visit (n = 30) vs. three good things (n = 44) vs. three funny things (n = 20), vs. using signature strengths (n = 35) vs. active placebo (early memories) (n = 34)	Online sample of female participants (mean age = 56)	<ul style="list-style-type: none"> - Subjective happiness - Depression 	One-week online intervention with individuals being assigned to a particular exercise
Social Connectedness				
Woodward et al., 2011 (USA) [102]	Pre- post- RCT with experimental (n = 45) vs. control (n = 38)	Community population (mean age = 72)	<ul style="list-style-type: none"> - Loneliness - Quality of life - Depression - Social network size - Perceived social support 	Twelve sessions aiming to increase social opportunities by teaching basic computer, email, and internet skills

Saito et al., 2012 (Japan) [103]	Pre-post- test design with intervention (n = 20) vs. wait-list control group (n = 40)	Community population of individuals who recently relocated (mean age = 73)	<ul style="list-style-type: none"> - Loneliness - Life satisfaction - Depression - Social support 	Four 120-minute group sessions to talk about experiences, opportunities, and a city tour with opportunities to socialize with other participants
Routasalo et al., 2009 (Finland) [104]	RCT pre- post- with intervention (n = 117) vs. control (n = 118)	Individuals with subjective feelings of loneliness (mean age = 80)	<ul style="list-style-type: none"> - Loneliness - Social network - Psychological well-being - Loneliness 	Twelve group-based meal and activity sessions facilitated by a professional group leader aimed to improve social skills
Banks and Banks, 2005 (USA) [105]	RCT pre- post- with intense intervention (n = 15) vs. moderate intervention n = 15), vs. control (n = 15)	Long-term care facilities (no mean age reported)	<ul style="list-style-type: none"> - Loneliness 	Six weeks of dog assisted therapy (one or three sessions each week depending on intervention level), allowing residents to walk and play with the same animal for the six weeks
Meaning in Life				
Chiang et al., 2008 (Taiwan) [18]	Pre- post- RCT with experimental (n = 36) vs. waitlist control (n = 39)	Taiwanese veterans (mean age = 78)	<ul style="list-style-type: none"> - Self-esteem - Life satisfaction 	Eight 60 to 90-minute group-based life review program sessions exploring topics including childhood memories, job, friends, and greatest accomplishments
Preschl et al., 2012 (Germany) [21]	Pre- post- RCT with experimental (n = 20) vs. waitlist control (n = 16)	Individuals with mild-moderate depression (median age = 70)	<ul style="list-style-type: none"> - Depressive symptoms - Self-esteem - Life satisfaction - Well-Being - Obsessive reminiscence 	Six 60 to 90-minute individual sessions with computer exercise supplementation with life review intervention
Breitbart et al., 2012 (USA)[79]	Pre- post- RCT with experimental (n = 64) vs. control (therapeutic massage) (n = 56)	Advanced stage ovarian cancer (mean age = 54)	<ul style="list-style-type: none"> - Spiritual well-being - Quality of life 	Seven 60-minute sessions with individual meaning-centered psychotherapy, which explored topics such as legacy, identity, limitations, creativity, connection, and hopes
Henry et al., 2010, (Canada) [106]	Pre- post- RCT with experimental (n = 12) vs. control of typical hospital and community-based supports (n = 12)	Advanced stage ovarian cancer (mean age = 55)	<ul style="list-style-type: none"> - Meaning in life - Existential distress 	One to four 30 to 90-minute sessions with therapists aimed at exploring themes of the meaning of a cancer diagnosis, past life events, and future priorities

Wisdom				
Neff & Germer, 2013 (USA) [76]	RCT pre- post- test design with intervention (n = 24) vs. wait-list control group (n = 27)	Community adults (mean age = 50)	<ul style="list-style-type: none"> - Self-compassion - Mindfulness - Compassion for others - Avoidance of negative feelings 	Eight 120-minute group-based sessions facilitated by clinical psychologists and self-compassion training with weekly topics and a half day meditation of
Labelle et al., 2015 (Canada) [82]	Pre-post- test design with intervention (n = 135) vs. wait-list control group (n =76)	Cancer patients (mean age = 52.7)	<ul style="list-style-type: none"> - Spirituality - Post-traumatic growth - Mindfulness 	Eight 90-minute group-based sessions facilitated by psychologist and a half day intensive session.
Resilience				
Treichler et al (USA) [100]	Modified stepped-wedge trial design (alternative cluster-randomized trials) (n = 89)	Suburban senior housing communities (mean age = 84.9)	- Resilience	Three 90-minute group-based sessions facilitated by a trained residential facilitator aimed at 1) recognizing aging as an opportunity for continued growth and enjoyment, 2) increasing positive emotions, and 3) engaging in values-driven activities, with additional savoring and gratitude exercises at home.
Robinson et al., 2019 (United Kingdom) [101]	Pre-post- test design (n = 191)	Individuals with chronic disease (age range = 45-80)	- Composite resilience score made up of scales of self-efficacy, social support, and overall well-being	Six 120-minute group-based participatory activities including sharing lived experiences, relaxation techniques, and coping strategies

Notes: RCT = Randomized Controlled Trial