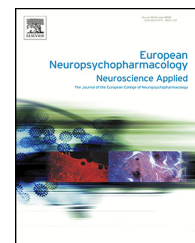




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REVIEW

Universal and selective interventions to promote good mental health in young people: Systematic review and meta-analysis



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Abstract

Promotion of good mental health in young people is important. Our aim was to evaluate the consistency and magnitude of the efficacy of universal/selective interventions to promote good mental health. A systematic PRISMA/RIGT-compliant meta-analysis (PROSPERO: CRD42018088708) search of Web of Science until 04/31/2019 identified original studies comparing the efficacy of universal/selective interventions for good mental health vs a control group, in samples with a mean age <35 years. Meta-analytical random-effects model, heterogeneity statistics, assessment of publication bias, study quality and sensitivity analyses investigated the efficacy (Hedges' g =effect size, ES) of universal/selective interventions to promote 14 good mental health outcomes defined a-priori. 276 studies were included (total participants: 159,508, 79,142 interventions and 80,366 controls), mean age=15.0 (SD=7.4); female=56.0%. There was a significant overall improvement in 10/13 good mental health outcome categories that could be meta-analysed: compared to controls, interventions significantly improved (in descending order of magnitude) mental health literacy (ES=0.685, $p<0.001$), emotions (ES=0.541, $p<0.001$), self-perceptions and values (ES=0.49, $p<0.001$), quality of life (ES=0.457, $p=0.001$), cognitive skills (ES=0.428, $p<0.001$), social skills (ES=0.371, $p<0.001$), physical health (ES=0.285, $p<0.001$), sexual health (ES=0.257, $p=0.017$), academic/occupational performance (ES=0.211, $p<0.001$) and attitude towards mental disorders (ES=0.177, $p=0.006$). Psychoeducation was the most effective intervention for promoting mental health literacy (ES=0.774, $p<0.001$) and cognitive skills (ES=1.153, $p=0.03$). Physical therapy, exercise and relaxation were more effective than psychoeducation

and psychotherapy for promoting physical health ($ES=0.498$, $p<0.001$). In conclusion, several universal/selective interventions can be effective to promote good mental health in young people. Future research should consolidate and extend these findings.

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1. Introduction

Mental health issues are expected to become one of the five more common causes of dismalness, mortality and dysfunction among youths (Gore et al., 2011). The worldwide prevalence of mental disorders in children and adolescents is estimated to be 13.4%: anxiety disorders 6.5%, disruptive disorders 5.7%, attention-deficit hyperactivity disorder 3.4% and depressive disorders 2.6% (Polanczyk et al., 2015). Besides, mental disorders in young people have a great economic burden on society (Fatori et al., 2018)". These facts highlight the importance of preventing mental disorders, but also of promoting good mental health in young people. Good mental health is defined as a state of well-being that allows individuals to cope with the normal stresses of life and function productively (Fusar-Poli et al., 2020). While the prevention of mental disorders in young people has entered clinical practice in psychiatry thanks to the psychosis prevention field (Fusar-Poli et al., 2013; Fusar-Poli et al., 2016), promotion of mental health has received less empirical research attention, mostly because research has been fragmented (Fusar-Poli et al., 2020). Core domains of good mental health have recently been defined and encompass the 14 areas of mental health literacy, attitude towards mental disorders, self-perceptions and values, cognitive skills, academic/occupational performance, emotions, behaviours, self-management strategies, social skills, family and significant relationships, physical health, sexual health, meaning of life, and quality of life (Fusar-Poli et al., 2020). Classification of interventions parallel those employed to classify the prevention of mental health; universal, selective or indicated, depending on the individuals they target (World Health Organization, 2004). Out of these, universal interventions target the general public or a whole population group that has not been identified on the basis of increased risk (World Health Organization, 2004) and selective interventions target individuals or subgroups of the population whose risk of developing a mental disorder is significantly higher than average, as evidenced by biological, psychological or social risk factors (Arango et al., 2018; World Health Organization, 2004). Both universal and selective interventions are particularly suited to promote good mental health (Fusar-Poli et al., 2020). Indicated interventions, on the other hand, target high-risk people who are identified as having minimal but detectable signs or symptoms (including prodromal help-seekers and clinical high risk populations) foreshadowing mental disorder or biological markers indicating predisposition for mental disorder but do not meet diagnostic criteria for the disorder (World Health Organization, 2004). Preventive interventions in this group were not the focus of the current review.

The consistency and magnitude of available and potential interventions to promote mental health are patched and conflicting. Different interventions have been tried to promote good mental health in healthy individuals, most frequently psychoeducation (Strunk et al., 2014; Witvliet et al., 2009) and psychotherapy (Collins et al., 2014; World Health Organization, 2002) and less frequently physical therapy (Sharp and Caperchione, 2016b), animal-assisted therapy (Pendry et al., 2014) and art therapy (Rousseau et al., 2009). To date, the most effective interventions for each of the core determinants of good mental health remain unknown (Fusar-Poli et al., 2020). This study aimed to systematically review and meta-analyse the consistency and magnitude of the efficacy of universal and selective interventions to promote good mental health in young people compared to the control group, using a-priori operationalisation of good mental health.

2. Experimental procedures

2.1. Protocol and registration

The study (study protocol registered on PROSPERO - CRD42018088708-), was conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009) (eTable I) and MOOSE checklist (eTable II) (Stroup et al., 2000), following EQUATOR Reporting Guidelines (Altman et al., 2008).

2.2. Eligibility criteria

Inclusion criteria were a) individuals with an average age <35 years, no lower age limit, in line with the upper age limit of the early psychosis paradigm (Fusar-Poli et al., 2019, 2020) reporting on universal interventions or selective interventions (see definitions of classification of preventive approaches in psychiatry in eTable III (Fusar-Poli et al., 2019)), c) with an intervention and a control group (randomized or non-randomized, and employing either double-blind, open-label or cross-over design), d) focusing on good mental health outcomes as defined in Table 1, with meta-analysable data (e.g. raw mean values and standard deviation, before and after the intervention, Risk Ratios, Odds Ratios or T-Students and direction of effects), e) original studies written in English language.

Exclusion Criteria were a) individuals with a mean age ≥ 35 years, b) interventions conducted in patients with a known mental disorder or presenting with subthreshold psychiatric conditions (clinical or subclinical, indicated interventions), c) lack of control group, d) reporting other outcomes, e) abstracts, conference proceedings, pilot data and reviews, f) studies written in a language other than English. Overlap between studies was actively searched using the intervention name and content, the type of selected population

Table 1 Empirical domains of good mental health (adapted from (Fusar-Poli et al., 2020)).

Domain	Definition
Mental health literacy	The ability to recognize and possess knowledge of a variety of different profiles of emerging and established mental disorders, factors and warning signs contributing to poor mental health as well as about the different mental health resources that can be accessed in case of need.
Attitude towards mental disorder	The way we react in front of someone with a mental disorder; Positive attitudes include understanding, being compassionate and empathic while decreasing discrimination towards people with poor mental health or with mental disorders. Negative attitude towards a person include stigma and stigmatizing behaviours, which leads to negative action or discrimination.
Self-perceptions and values	A collection of subjective beliefs, values and emotions about one's own internal and external characteristics, shaping one's attributional style, self-compassion and self-esteem, impacting awareness and acceptance, leading to living a valued life.
Cognitive skills	The ability to pay attention, remember and organize information, while having a degree of cognitive flexibility, attention to enable decision making and solve problems.
Academic/occupational performance	Objective learning and knowledge, study achievements, attendance and behavior as well as school adjustment and academic adaptation.
Emotions	Affective states with arousing or motivational properties that lead individuals to a certain response or behavior.
Behaviors	Behaviors are the conducts in which a person proceeds when a stimulus is presented to them.
Self-management strategies	Practical, everyday skills needed to effectively and independently take care of oneself and to function and meet the demands of the environment: coping skills to deal with stress, problem solving and decision making to face the adversities that may appear.
Social skills	Social skills are abilities that allow young people to interact and communicate with each other in order to foster positive relations.
Family and significant relationships	The ability to establish meaningful relationships with other family members; healthy and positive relationships and connectedness with family members within a secure environment, which facilitates positive communication and interaction.
Physical health	Physical variables, visible symptoms and measures related to a positive physical status and dimensions of health.
Sexual health	A state of physical, emotional, mental and social well-being in relation to sexuality.
Meaning of life	Feeling that life has a purpose and a significance.
Quality of life	The general well-being of a person, defined in terms of health, happiness and satisfaction with life.

and country in which the study was carried out. When overlap was found, we selected the study with the largest sample.

2.3. Search and study selection

A systematic search strategy to identify relevant articles, and a two-step literature search using the following keywords: “mental health” AND “promotion” was implemented by independent researchers (GSP, MS, OBB). As a first step, the Web of Science database (Clarivate Analytics) was searched, incorporating the Web of Science Core Collection, the BIOSIS Citation Index, the KCI-Korean Journal Database, MEDLINE®, the Russian Science Citation Index, and the SciELO Citation Index, from inception until 31st April 2019. Then, references of the articles retrieved during the literature search were searched manually (GSP, AdM, VV).

2.4. Data collection process

At least two researchers (VV, LdM, OBB, UP, FR, FC, GN, BdM, IF, SM, EF, MM) independently extracted data from all the included studies, into an electronic database. The database was then cross-

checked by a third author (GSP, AC), and any discrepancies were resolved through consensus under the supervision of a senior researcher (PFP).

2.5. Data items

Variables included in the study were: study ID; country; type of primary intervention (universal, selective); intervention content (psychoeducation, psychotherapy, other, combined); intervention name; control group (active control, no intervention, treatment as usual); sample size; sex (% male); age (mean, SD); quality assessment (see below); outcomes.

2.6. Good mental health outcomes

A detailed discussion of 14 relevant outcome categories and outcomes within promotion of mental health is fully provided in a complementary publication by a group of experts (Table 1) (Fusar-Poli et al., 2020). When >1 measure from the same mental health outcome was available in the same study, we extracted the measure most frequently investigated across the existing literature.

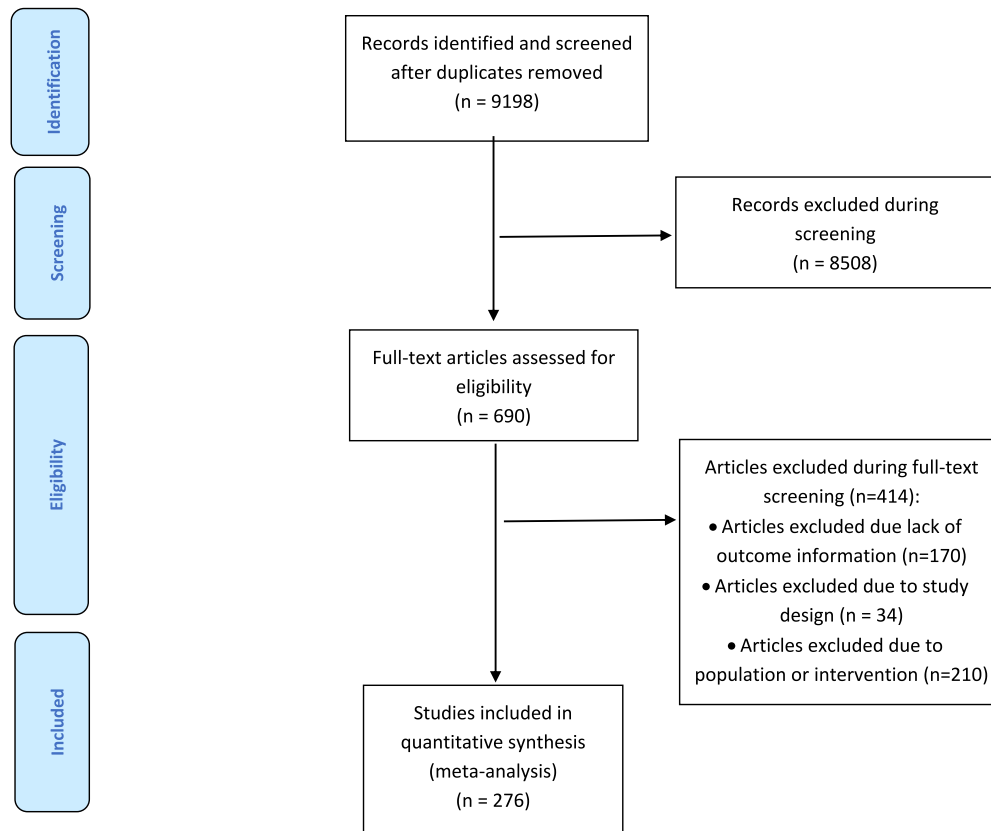


Fig. 1 PRISMA flowchart.

The study with the largest sample size was selected when the previous criterion was not discerning.

2.7. Risk of bias (quality) assessment

As per protocol, we rated randomization according to the following scoring system: 0 for studies with no randomization or in which this was not mentioned; 1 for studies in which there was some randomization, but the type was not specified; 2 for studies with clear method of randomization. We rated blinding according to the following scoring system: 0 for studies without blinding or in which this was not mentioned/specified; 1 for studies with single blinding; 2 for studies with double or triple blinding. We decided to use a simpler score in front of "Cochrane Collaboration's Tool for assessing risk of bias in randomised trials" because it would have been difficult to apply it to the current database.

2.8. Strategy for data synthesis, summary measures and analyses

The primary effect size (ES, Hedge's g) was estimated when three or more studies were available, with positives values reflecting an improvement at follow-up in the intervention group compared to the control group and negative values indicating a superior improvement in the control group. The Hedges' g is obtained with the difference between the means of the patient and control groups divided by the standard deviation (or from associated measures) and weighted for sample size. The meta-analysis included overall summary effects stratified by the different types of good mental health

outcomes and sensitivity analyses, with each subgroup defined by the type of intervention that was provided (psychoeducation vs psychotherapy vs others vs combined interventions), by the type of primary intervention (universal vs selective) and by the age period (children and adolescents vs adults). Heterogeneity among study point estimates was assessed using the Q statistic, with the proportion of the total variability in ES estimates being evaluated using the I^2 index (with an $I^2 > 50\%$ representing significant heterogeneity) (Lipsey and Wilson, 2000). We used a random-effects model as heterogeneity was expected to be high (DerSimonian and Laird, 1986). The presence of publication bias in the results was assessed informally by visually inspecting funnel plots, complemented by the "trim and fill" method to investigate the effects of any publication bias that was detected. We further conducted meta-analytical regression analyses to estimate the association between the quality of the included studies and the effectiveness of the interventions. For these meta-regression analyses, scores from both randomization and blinding were added, resulting in a total value ranging from 0 to 4. Analyses were performed with Comprehensive Meta-Analysis Version 3 (Biostat, Englewood, NJ, USA), two-sided and with $\alpha = 0.05$.

3. Results

3.1. Study selection

The literature search yielded 9,198 citations, which were screened for eligibility; 690 articles were assessed for eligibility and 276 studies were finally included in the meta-analysis (Fig. 1 PRISMA flowchart, eTable IV main characteristics of included studies).

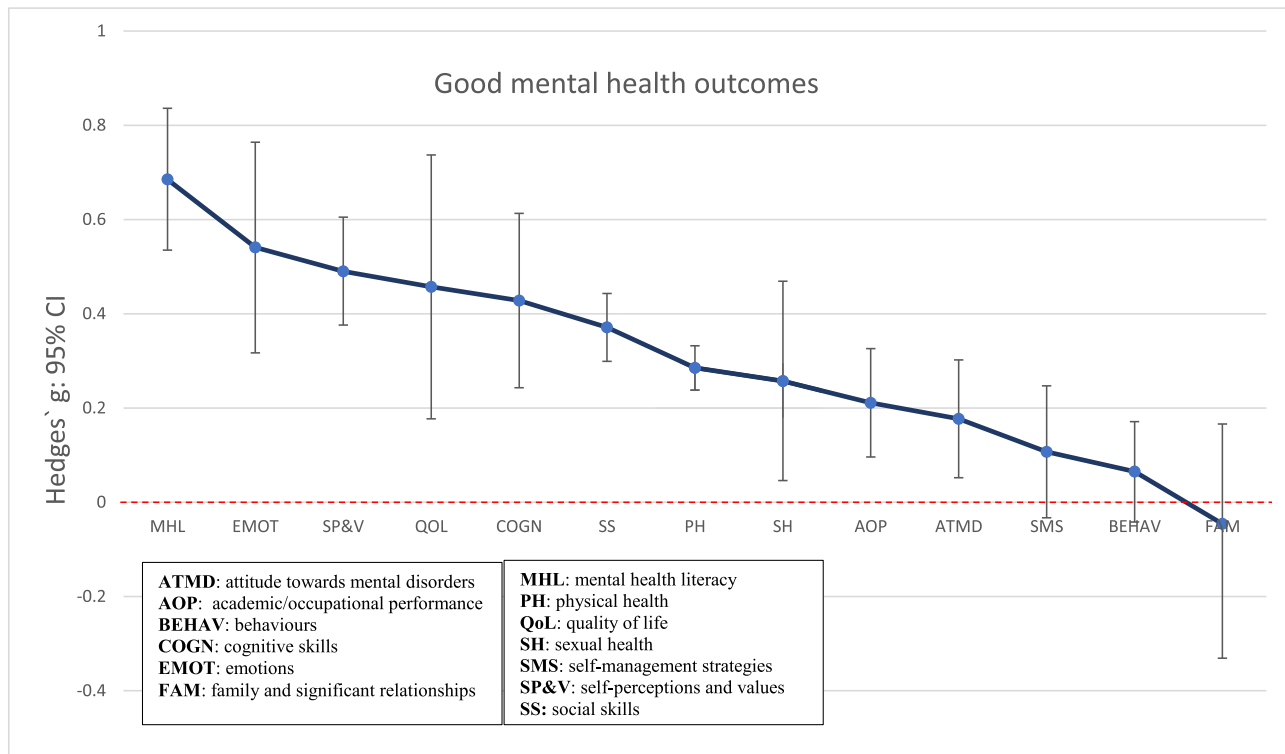


Fig. 2 Overall efficacy of universal and selective interventions on good mental health outcomes.

3.2. Study characteristics

Outcomes were targeted as follows: 45 (16.3%) articles focused on mental health literacy, 16 (5.8%) on attitude towards mental disorders, 92 (33.3%) on self-perceptions and values, 20 (7.2%) on cognitive skills, 30 (10.9%) on academic/occupational performance, 37 (13.4%) on emotions, 11 (4.0%) on behaviors, 86 (31.2%) on self-management strategies, 94 (34.1%) on social skills, 45 (16.3%) on family and significant relationships, 25 (9.1%) on physical health, 13 (4.7%) on sexual health and 48 (17.4%) on quality of life (eTable V-VII). We did not find any studies on the promotion of meaning of life in young individuals, which is why we could not perform a meta-analysis on this 14th outcome domain. The type of intervention was universal in 171 (61.9%) studies, selective in 104 (37.7%) studies and both universal and selective in 1 (0.4%) (Hiscock et al., 2018) study. The overall database included 159,508 individuals (mean age range=0-34.3 years; female=56.0%, 79,142 interventions and 80,366 controls). The total sample size of the studies included ranged from 13 (Attwood et al., 2012) to 8,989 (Shinde et al., 2018).

3.3. Synthesis of results: interventions to promote good mental health outcomes

Interventions were effective to promote mental health literacy ($k=45$, $n=37,533$; $ES = 0.685$; $p<0.001$), emotions ($k=37$, $n=7,593$ $ES=0.541$; $p<0.001$), self-perceptions and values ($k=92$, $n=37,183$ $ES=0.49$; $p<0.001$), quality of life ($k=48$, $n=31,276$; $ES=0.457$; $p=0.001$), cogni-

tive skills ($k=20$, $n=12,368$; $ES=0.428$; $p<0.001$), social skills ($k=94$, $n=62,274$ $ES=0.371$; $p<0.001$), physical health ($k=25$, $n=7,642$; $ES=0.285$; $p<0.001$), sexual health ($k=13$, $n=14,202$; $ES=0.257$; $p=0.017$), academic/occupational performance ($k=30$, $n=19,324$ $ES=0.211$; $p<0.001$) and attitude towards mental disorders ($k=16$, $n=8,741$; $ES=0.177$; $p=0.006$), vs control conditions (eTable V-VII and Fig. 2). There was no evidence that interventions could significantly improve behaviors ($k=11$, $n=10,474$; $ES=0.065$; $p=0.23$) or family and significant relationships ($k=45$, $n=32,639$; $ES=-0.046$; $p=0.674$) (eTable V-VII and Fig. 2). Once publication bias was corrected with the trim and fill method, self-management strategies became nonsignificant ($k=86$, $n=41,437$; $ES=0.517$; $p<0.001$ corrected to $ES=0.107$; $p=0.09$).

3.4. Additional analysis/sensitivity analyses: types of interventions and preventive approach

Among available comparisons, there were no differences in efficacy among the different intervention categories to improve emotions ($p=0.729$), self-perceptions and values ($p=0.309$), quality of life ($p=0.341$), social skills ($p=0.182$), sexual health ($p=0.718$), academic/occupational performance ($p=0.234$), behaviors ($p=0.622$), family and significant relationships ($p=0.327$) or self-management strategies ($p=0.281$). Psychoeducation was the most effective intervention for the promotion of mental health literacy ($p<0.001$) and cognitive skills ($p<0.001$). Physical therapy, exercise and relaxation were the most effective type of interventions for the promotion of physical health ($p<0.001$).

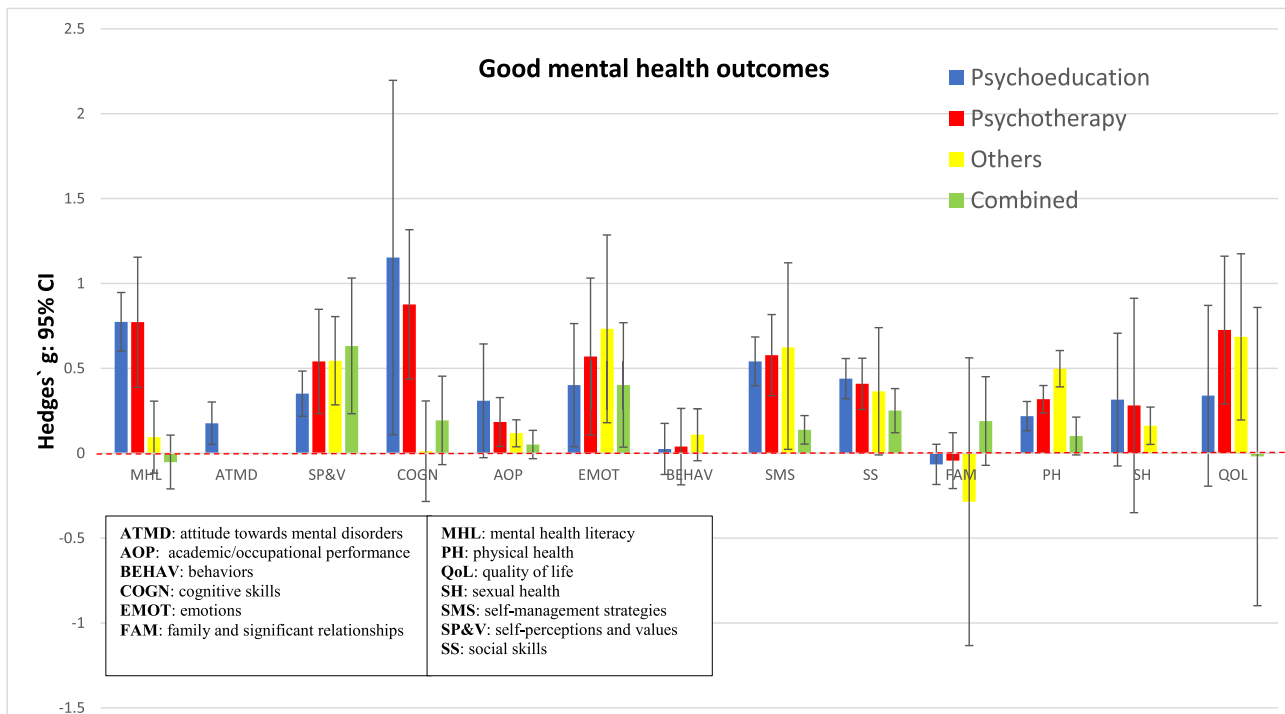


Fig. 3 Comparative efficacy of type of preventive interventions.

All the interventions to improve attitude towards mental disorders consisted on psychoeducation, so differences could not be evaluated (eTable V, Fig. 3).

For cognitive skills, universal interventions fared better than selective interventions ($p < 0.001$). There were no differences between universal and selective interventions for mental health literacy ($p = 0.699$), attitude towards mental disorders ($p = 0.17$), self-perceptions and values ($p = 0.063$), academic/occupational performance ($p = 0.955$), emotions ($p = 0.678$), behaviors ($p = 0.832$), self-management strategies ($p = 0.686$), social skills ($p = 0.388$), family and significant relationships ($p = 0.708$), physical health ($p = 0.098$), sexual health ($p = 0.148$) or quality of life ($p = 0.889$) (eTable VI, Fig. 4). For cognitive skills, interventions for children and adolescents fared better than interventions for adults ($p = 0.007$). There were no differences between children and adolescents vs adults interventions for mental health literacy ($p = 0.717$), attitude towards mental disorders ($p = 0.127$), self-perceptions and values ($p = 0.298$), academic/occupational performance ($p = 0.143$), emotions ($p = 0.440$), self-management strategies ($p = 0.966$), social skills ($p = 0.169$), family and significant relationships ($p = 0.144$), physical health ($p = 0.528$), sexual health ($p = 0.908$) or quality of life ($p = 0.578$) (eTable VII).

3.5. Heterogeneity and publication bias

Heterogeneity across the included studies was statistically significant for all outcomes ($p < 0.001$), ranging from 64.377 (behaviors) to 98.670 (quality of life). Publication bias was detected in two outcome categories and corrected with the trim and fill method: behaviors (ES 0.065 corrected to ES=0.099) and self-management strategies, which became

non-significant after the correction (ES=0.517 corrected to ES=0.107) (eTable V).

3.6. Quality assessment

The quality of the included studies ranged from 0;0 (20.6% of the studies: no randomization, no blinding) to 2;2 (0.3% of the studies: clear method of randomization, double blinding) (eTable VIII). None of the studies employed triple blinding. The meta-regressions revealed no significant association between efficacy of the interventions to promote mental health and the quality of the studies (all $p > 0.05$) (eTable IX).

4. Discussion

To our knowledge, this is the first systematic review and meta-analysis to comprehensively explore and summarize the impact of universal and selective interventions on the promotion of good mental health. The study demonstrated that universal and selective promotion of good mental health outcomes (mental health literacy, emotions, self-perceptions and values, quality of life, cognitive skills, social skills, physical health, sexual health, academic/occupational performance and attitude towards mental disorders) in young people is feasible and may be effective, although further research is needed.

Our review identified 276 individual intervention studies with 159,508 participants. We did not limit our search to interventions conducted in particular groups of individuals (e.g., health profession students (Lo et al., 2018) or nursing

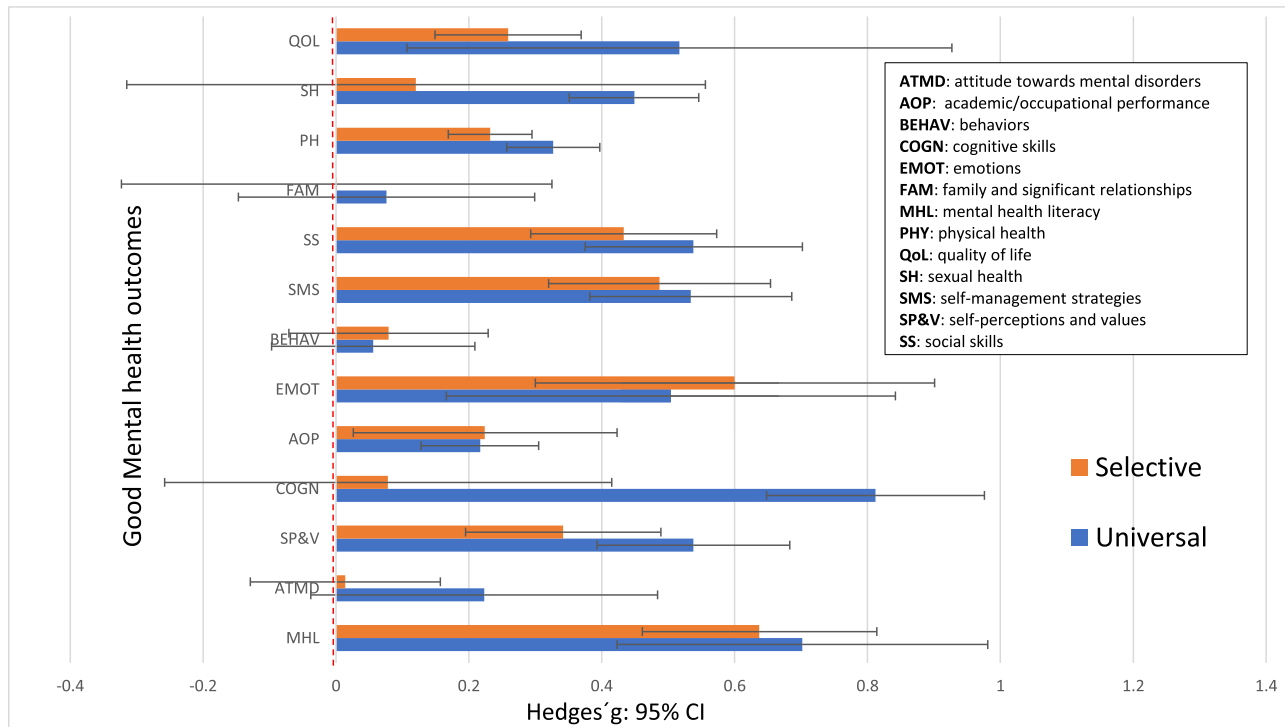


Fig. 4 Comparative efficacy of universal vs selective interventions*

*Only mental health outcomes with both universal and selective interventions are represented in the graph.

students (Li et al., 2018)), as in previous reviews. Furthermore, our 14 good mental health outcome categories were defined a-priori. We found a significant improvement in 10 out of the 13 meta-analyzable outcomes. Overall, the magnitude of the effect sizes for improving good mental health outcomes ranged from small ($ES=0.177$ to 0.49) regarding attitude towards mental disorders, self-perceptions and values, cognitive skills, academic/occupational performance, social skills, physical health, sexual health and quality of life, to medium ($ES=0.541$ to 0.685) for mental health literacy and emotions. There were no large effect sizes for improving good mental health. The interventions to improve self-management strategies, family and significant relationships or behaviors were not effective. Overall, the ES were small to moderate, but they are comparable to ES found for the selective and universal prevention of poor mental health outcomes. Because universal and selective interventions typically target asymptomatic populations, variance in mental health outcomes is expected to be reduced and, consequently, the magnitude of the effect sizes for these interventions can only be expected to be relatively small. At the same time, since these samples are young and not yet affected by psychiatric conditions, small effect sizes can translate into relevant benefits in the longer term, some of which may extend to the whole general population.

Our meta-analysis also provided some insight on the comparability of universal vs selective or specific type of intervention categories that may be more effective to promote good mental health. The highest improvement in ES (0.685) was for mental health literacy, with no difference between universal or selective approaches. A previous systematic review has drawn attention into the difficulties ob-

served in young individuals to recognize mental problems (Singh et al., 2019). Another systematic review suggested the potential utility of psychoeducation to improve mental health literacy (Tay et al., 2018), but we did not replicate this finding. We found that psychoeducation was the most effective intervention for the promotion of mental health literacy. Our results also support similar benefits of selective and universal interventions to improve emotion awareness and knowledge ($ES=0.541$). This finding is clinically relevant because it has the potential to enhance and to improve resilience and personal resources (Kushnir et al., 2012). We found that the category self-perceptions and values has been the most studied in the literature (92 studies). Previous meta-analytical evidence suggested that psychotherapy may improve this domain acting on self-esteem (from Cohen's $d=0.34$ for one-day workshops to $d=1.12$ for weekly sessions (Kolubinski et al., 2018)), but we did not confirm superiority of psychotherapy over other types of interventions. Although the ES of our findings was modest ($ES=0.541$), we demonstrate that universal and selective interventions to promote self-perceptions are equally effective and should not be reserved only for individuals who suffer from a mental disorder or subthreshold conditions (Linardon et al., 2019). Our finding that universal and selective interventions can comparably improve quality of life ($ES=0.457$) extend previous systematic reviews and meta-analyses (Calver et al., 2018; Kolubinski et al., 2018) suggesting that this domain can be improved by psychosocial interventions in specific populations with mental and physical health problems. The only good mental health domain on which universal fared better than selective interventions related to cognitive skills ($ES=0.428$).

Interventions for this outcome were particularly effective in children and adolescents, probably due to the maturational brain changes that occur during the early development and the increased neuroplasticity in younger individuals (Fusar-Poli, 2019; Salazar de Pablo et al., 2019). While most meta-analyses in psychiatry focusing on interventions to improve social skills have focused on individuals with established mental disorders (e.g., psychosis (Turner et al., 2018) or autism-spectrum disorders (Gates et al., 2017)), with promising results, our study demonstrates that the acquisition of social skills can be improved through universal interventions aimed at the general population. This is clinically important because cognitive skills have shown to reduce psychological distress (Medalia et al., 2017), as well as to allow individuals to obtain better productivity and occupational outcomes (Chan et al., 2015; Kumar et al., 2017). Social skills may also lead to greater ability to initiate and maintain meaningful relationships (Fusar-Poli et al., 2020). By training social skills, the ability of young children to cope with potentially difficult social situations can be strengthened (Sawyer et al., 1997). Psychoeducation was the best intervention for improving cognitive skills, which was associated with a large effect size (but see eLimitations). We also showed that it may be possible to use universal and selective interventions similarly, to promote physical health (ES=0.285) and sexual health (ES=0.257) in young individuals. Young individuals with mental health problems have poorer physical and sexual health than their general population counterparts (Kaushik et al., 2016). According to our meta-analysis, the category “other interventions”, which encompass physical exercise programs (Bang et al., 2017; Sharp and Caperchione, 2016a), is more beneficial than psychoeducation or psychotherapy for improving physical health in young people. This finding is consistent with guidelines for mentally ill patients (Stubbs et al., 2018). Improving physical health is an important goal in young people with emerging and manifest mental disorders, whose physical health is poorer than in the general population and associated with greater physical morbidity and mortality (Correll et al., 2015; Correll et al., 2017; De Hert et al., 2011a; DE Hert et al., 2011b; Firth et al., 2019; Stubbs et al., 2016). Universal and selective interventions are similarly effective to improve academic/occupational performance (ES=0.21), to a magnitude that is similar to that reported in a previous meta-analysis evaluating the effectiveness of physical activity (ES= 0.26) (de Greeff et al., 2018) or psychoeducation (ES=0.18) (Conley et al., 2015) to boost academic performance. Finally, we found that universal and selective interventions are equally effective to improve attitude towards mental disorders (ES=0.177). A recent meta-analysis found that reductions in stigmatizing attitudes to prevent poor mental health are feasible in a larger scale with similar magnitude of the ES (Cohen’s $d=0.24$ to 0.40) (Morgan et al., 2018).

Despite these positive results, we found no evidence that interventions could improve behaviors, family and significant relationships or self-management strategies. Furthermore, we did not find any studies about promotion of meaning of life in young people to be able to meta-analyse its interventions. Meaning of life has gained interest in the last years, and several selective interventions have been conducted, but, more frequently, in patients affected with

medical conditions, particularly cancer (Henry et al., 2010; Park et al., 2019; Pelekasis et al., 2016). Meaning of life may be a domain that deserves more attention for the promotion of good mental health in young people as well, especially given the high suicide rates in that age group and, especially, those with emerging and manifest mental disorders.

This study has several limitations. First, the amount of evidence regarding some mental health outcomes was limited, including for meaning of life, sexual health and behaviours outcomes. However, the database was sufficiently large to robustly test most of the other outcomes. Second, we were unable to quantify the differential efficacy of specific interventions that were pooled in the “other” and “combined” subgroups or the differential efficacy of distinct types of psychotherapies. Also, the evidence on pharmacological interventions to promote good mental health was very limited and its efficacy remains unknown. We also did not evaluate the putative efficacy of diet or food supplements. Third, due to the limited granularity of information, we were unable to quantify the comparative efficacy for some of the intervention subgroups, for example attitude towards mental disorders, in which only psychoeducation interventions were found. Fourth, the quality of some studies was low, missing proper blinding and randomization, or at least did not sufficiently report these features. However, our meta-regression analyses found no associations between efficacy of interventions and quality of the studies. Fifth, we were not able to disentangle the optimal age range to deliver each of the interventions to promote good mental health except for cognitive skills, which seem more effective in children and adolescents. Sixth, the long-term efficacy of the interventions tested beyond the experimental period was not investigated. Finally, the available evidence is not stratified to specific subgroups of young people (stratified medicine) or tailored to the individual subject level (precision medicine (Fusar-Poli et al., 2018)). New collaborative multicentre studies (Las Hayas et al., 2019) and randomized controlled trials are needed to overcome these limitations. Importantly, it will be essential to achieve the development of more standardised instruments to measure a core outcome set of good mental health dimensions. This study paves the way towards the accomplishment of these goals over the next generation of research.

5. Conclusions

Several interventions seem effective to promote good mental health in young people. Although we have attempted to define the outcomes a-priori, there are no harmonized operationalizations and assessment instruments to ascertain them. Future research should develop innovative outcome sets and measurement criteria to consolidate and extend these findings.

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PFP conceived the study, GSP conducted the analyses and drafted the first version of the manuscript. ADM, DO, AC, VV, LDM, IB, JVS, OB, UP, FR, FC, GN, BDM, IF, SM, EF, MM, obtained the data. DN, CC, LVK, AP, AB, SB, CA, TV, EV, MS, UB, JIS revised the manuscript and provided a substantial conceptual contribution. All authors proofread and approved the final draft of the manuscript.

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Declaration of Competing Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Supplementary materials

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