Resilience in the educational system

A meta-analysis of school-based interventions aimed at promoting resilience

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Happiness is not the absence of problems but the ability to deal with them.

H. Jackson Brown

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Abstract

Objectives: The present study investigated the effectiveness of positive school-based interventions aimed at promoting resilience. **Methods**: A systematic review and meta-analysis were performed. By that an update of Meike Van der Linden's (2012) study was conducted. **Results**: 19 studies were included in the meta-analysis. An overall effect size of 0.24 on resilience was found, indicating a small effect. Concerning the two subgroups of primary and secondary school students no significant differences in effect sizes were found. **Conclusion:** It can be concluded that the effects of school-based interventions aimed at resilience are small. Regarding the results against the background of earlier meta-analyses on universal school-based interventions, the results can be interpreted as a confirmation of earlier work. Further, this study is only a first step in the investigation of resilience in the educational context as more has to be done to gain a more comprehensive knowledge of resilience. However, this study gives an outlook on the current state of the art of positive psychology in the educational system and supposes that future research should pursue this way in order to make students more resilient and improve their mental health.

Samenvatting

Doelstelling: De doelstelling van deze studie was het verkennen van de effectiviteit van universele schoolinterventies gericht op het bevorderen van veerkracht. **Methode**: Een systematic review en een meta-analyse zijn uitgevoerd. Hiermee werd een update gedaan op de studie van Meike Van der Linden (2012). **Resultaten**: 19 studies werden geïncludeerd in de meta-analyse. Een overall effect van 0.24 voor veerkracht werd gevonden, wat aantoont dat er sprake is van enige effectiviteit van de interventies. Met betrekking tot de twee subgroepen van studenten van het basisonderwijs en het voortgezet onderwijs werd er geen significant verschil in effectiviteit van de interventies gevonden. **Conclusie**: Er kan geconcludeerd worden dat de effecten van schoolinterventies, die gericht zijn op het bevorderen van veerkracht, klein zijn. In het kader van eerdere meta-analyses over universele schoolinterventies, kunnen de gevonden resultaten als een bekrachtiging van de eerdere resultaten gezien worden. Verder is deze studie slechts een eerste stap in het onderzoek naar veerkracht in het schoolsysteem. Het geeft een eerste inzicht in de actuele situatie van de positieve psychologie in het onderwijssysteem en stelt voor dat toekomstig onderzoek in deze richting gedaan moet worden om meer kennis te verkrijgen over veerkracht en om de situatie van studenten in het onderwijssysteem te verbeteren.

1. Introduction

In 2000 an article by Seligman and Csikszentmihalyi in the *American Psychologist* changed our view of psychology. They claimed for a radical change in psychology: Away from the exclusive focus on psychopathology, the attention should also go to the more positive mechanisms and processes of optimal functioning individuals. This means a radical shift from a preoccupation with repairing weaknesses and treating disorders to the promotion of positive qualities and strengths (Clonan, Chafouleas, McDougal & Riley-Tillman, 2004). They called that movement 'positive psychology' (Seligman and Csikszentmihalyi, 2000) and thus reacted to the prevalent 'disease' model of contemporary psychology (Seligman, 2002). Since 2000 a lot happened and positive psychology has received considerable attention from different applied psychological disciplines (Miller & Nickerson, 2007). In the first Dutch *Handboek Positieve Psychologie* Bohlmeijer, Bolier and Walburg (2013, chapter 1) conclude that positive psychology has become a serious movement in psychology and define it as the science of well-being and optimal functioning.

One important term in positive psychology is resilience. Resilience can broadly be defined as a successful adaption to adverse conditions (Norman, 2000). The American Psychological Association (APA, 2014; Newman, 2005) describes these adverse conditions as trauma, tragedy, threat or significant sources of stress. Resilience can be seen as 'bouncing back' from these difficult experiences. Doing research on resilience Masten (2001) found that it is quite ordinary and people commonly demonstrate it. Further, resilience can be learned (APA, 2014). Thus, it is not a trait that one possesses or not, but it can be developed in anyone. In accordance with that Egeland, Carlson and Sroufe (1993) describe resilience as a process or as a 'capacity that develops over time in the context of person-environment interactions' (p.1).

Resilience is in fact relevant in many contexts and all age-groups (APA, 2014; Masten, 2001). The study at hand however will focus on the educational context and specifically on primary and secondary school students. The aim of the current study is thereby to get an insight into the effectiveness of positive school-based interventions aimed at promoting resilience. A systematic review and meta-analysis are conducted. The research question runs as follows:

What effects do positive school-based interventions aimed at promoting resilience have on both basic school students and secondary school students?

The target group of primary and secondary school students was chosen, because of the difficulties the educational system is faced with these days. Problems with motivation, drugs and mental illnesses are a daily occurrence and have negative influences on the education and atmosphere at school (Lens & Decruyenaere, 1991; Johnston et al., 2010). Ter Bogt et al. (2003) found for instance that one out of five Dutch 11 to 18 year old students is suffering from emotional problems or depressive symptoms.

Thus, based on these adversities in the educational system, it can be concluded that resilience plays an important role in school. Efforts to promote it should be embraced, because developing more resilience in students has many positive consequences. First of all, as was indicated by a correlational study by Campbell-Sills, Cohan and Stein (2006), resilient students show less signs of mental illnesses. They are better prepared to deal with diverse adversities of life. Secondly, resilient students are more successful in school and able to follow the learning matter. They are more likely to thrive socially and academically and to develop into happy and capable adults (Benard, 1995).

Further, it has to be noted that school institutions are perfectly suited to foster positive development and thus resilience, because they have staff resources and direct access to children and their parents (Clonan et al., 2004). Also children and adolescents spend a lot of their time in school. Hofferth und Sandberg (2001) for instance found that in the United States 6 to 17 year-olds typically spend 30–35 hours per week in school. Thus, students' experiences in school and theirs interactions and conversations with peers and teachers can be important targets for positive psychological interventions.

Hence, it can be concluded that on the one hand resilience plays an important role in the educational context and on the other hand the educational context is also perfectly suited to promote resilience in students. Nonetheless, resilience in schools is vastly understudied compared to disease and vulnerability (Campbell-Sills, Cohan & Stein, 2006). The study at hand therefore aims to gain insight into the effectiveness of school-based interventions aimed at resilience and thereby develop a more comprehensive understanding of resilience in the educational context. Thereby, this study follows the view of positive psychology and encourages the application of scientific method to growth and positive adaptation.

Further, the current study is an update of Van der Linden's (2012) systematic review and meta-analysis on school-based interventions aimed at resilience and well-being. In a fast growing movement such as positive psychology constant updates are necessary to keep an up-to-date knowledge. Thus, next to developing a more comprehensive knowledge of resilience,

the study at hand also strives to give a more general outlook on the current state of the art of positive psychology in the educational context.

In the following, resilience is more closely discussed as a multidimensional concept and as a developmental process, before the study's hypotheses are formulated.

Resilience as a multidimensional concept

Based on literature (Greenberg, 2006), resilience can be seen as a multidimensional concept. Three broad types of factors can be identified (Greenberg, 2006). Firstly, there are the characteristics of the individual that have influence on resilience. Temperament or cognitive abilities for instance have to be considered in that context. Secondly, the quality of relationships with other people is also of importance. Dumont and Provost (1999) for instance found that social support can play a protective role on experiences of stress. Lastly, broader ecological factors have to be considered. Thus, the environment people live in such as safe neighborhoods or good schools is also important for resilience.

The study at hand will focus primarily on the first factor: the characteristics of the individual. Thus, this study will not concentrate on school programs that target the whole school and change the school's curriculum (cp. above: broader ecological factors). Rather, individual school-based interventions are investigated with the aim to target the individual characteristics and their relationship with resilience. At this level (characteristics of the individual) the concept of resilience can also be grouped into different elements. In the following a choice is made for two important elements that were discussed in many studies concerning resilience (Dumont & Provost, 1999; Spencer, Josephs & Steele, 1993; Rutter, 1987): coping and self-esteem. It is important to mention that this study doesn't raise the claim to provide for an exhaustive overview of different elements of resilience. Rather, based on current literature, a choice was made for two of the most important elements of resilience.

First of all, coping is an important element of resilience. It refers to 'the things people do to avoid being harmed by life strains' (p.2; Pearlin and Schooler, 1978). Considering this definition, the overlap between coping and resilience is striking. Likewise a controlled effect study by Dumont and Provost (1999) points at this relationship. They compared three groups of adolescents (well-adjusted, resilient and vulnerable) on different outcome variables, amongst other things 'coping strategies'. It was found that resilient adolescents had higher scores on coping strategies than adolescents in the two other groups.

Further, considering coping, problem-solving skills also have to be taken into account, since problem-solving skills are seen as an important factor of coping. In a hierarchical factor analysis for instance Tobin et al. (1989) found that problem solving is one of eight primary factors of coping. And in many studies these two concepts are even used interchangeably. Campbell-Sills, Cohan and Stein (2006) for instance talk about task-oriented coping and mean by that the use of problem-solving skills to cope with a problem. Furthermore, they also found that task-oriented coping is positively related to resilience. Thus, it can be concluded that coping and problem-solving skills are closely related and are important elements of resilience (Van der Linden, 2012).

Secondly, self-esteem also plays a role in resilience. In the aforementioned study by Dumont and Provost (1999) it was found that resilient adolescents had higher scores on self-esteem than vulnerable adolescents. Further, also other studies point at the important role of self-esteem in resilience (Spencer, Josephs & Steele, 1993; Rutter, 1987). Considering homeless youth, a group in which resilience certainly plays an important role taking their troubled circumstances into account, Kidd and Shahar (2008) found as key implication that self-esteem is of great importance to resilience in this group. Thus, it can be concluded that self-esteem is an important element of resilience.

Summing up, it can be said that resilience is a multidimensional concept consisting of the characteristics of the individual, the relationships with other people and the broader ecological context. The study at hand focuses on the level of individual characteristics and thereby on the two aforementioned elements coping (problem-solving skills) and self-esteem.

Resilience as a developmental process

After gaining insight into the multidimensional character of resilience, this paragraph will focus on how resilience develops in individuals. As has already been mentioned above, resilience can be learned (APA, 2014). It is a capacity that develops over time (Egeland, Carlson & Sroufe, 1993). Many studies have found that developmental change in individual resilience factors is age-dependent. The following paragraph will discuss on that by taking a look at the two chosen elements of resilience.

Considering coping strategies, literature can be found suggesting that it improves with age. Hampel (2007) for instance writes that developmental change in cognitive abilities leads to the use of more complex coping strategies. And considering problem-solving skills Spivak and Shure (1985) also found that these change and improve with age. The cognitive development and social experience is suggested to be of great influence in this context.

Further, it was found that older adolescents are more effective in coping, because they are more likely to try alternative strategies when the initial coping strategy is not effective (Williams, McGilicuddy-De Lisi, 1999). Thus, it can be concluded, that literature point at a relationship between increasing age and successful coping.

Concerning self-esteem, it can be found that scores are lowest for adolescents. Frost and McKelvie (2004) for instance compared three age groups: primary school students, secondary school students and university students. They found that self-esteem was lower for secondary school students than for the two other groups. This finding is in accordance with the results of a large-scale study by Marsh (1989), who found that self-esteem is lower in adolescence than in childhood or adulthood. These observations have been made in western countries. Watkins, Dong and Xia (1997), however, also investigated self-esteem in a non-western context. They compared two groups of Chinese children. The first group had a mean age of 10 years and the second group had a mean age of 13 years. It was found that the older group showed lower scores on self-esteem than the younger group. Thus, based on these studies it can be assumed that self-esteem in adolescents or in secondary school students is lower than in all other age groups.

Summing up, based on the aforementioned literature it can be assumed that scores on coping are higher for secondary school students, compared to self-esteem, which should be more prevalent in primary school students.

Hypotheses

Based on the aforementioned findings, the study at hand assumes that interventions aimed at promoting resilience are more effective for primary school students than for secondary school students. The assumption that resilience is a developmental process (Noltemeyer & Bush, 2013; Masten, 2001; Egeland, Carlson & Sroufe, 1993) indicates that resilience should be further developed in older students, thus it should be harder to achieve effects in promoting resilience in the group of secondary school students, because they already score high on it. The main hypothesis therefore runs as follows:

Positive school-based interventions aimed at promoting resilience are more effective on primary school students than on secondary school students.

Concerning this hypothesis, a word of caution is necessary. Seeing resilience as a developmental process is based on literature and thus formulating this hypothesis is a reasonable consideration. However, it can be questioned whether primary school students are

even able to show resilience to the same degree that secondary school students are. If resilience is dependent on cognitive development and maturation, attempts to promote it in primary school students could be doomed to failure. Also, it could be critically asked whether promotion of resilience in secondary school students is actually necessary based on the assumption that resilience is a developmental process and sooner or later everyone develops it. These reasonable doubts will be addressed more deeply in the discussion.

Next to investigating the aforementioned main hypothesis, the study at hand will also investigate the two aforementioned elements of resilience and compare these for the two different age-groups of primary and secondary school students. Firstly, since it is assumed that coping and problem-solving skills are higher in secondary school-students, it is assumed that interventions with outcomes in these are more effective on primary school students, because it should be easier to achieve an effect on coping and problem-solving skills in a group that scores low on these. The second hypothesis states therefore:

Positive school-based interventions with outcomes in coping or problem solving skills are more effective on primary school students than on secondary school students.

Further, as is already mentioned above, self-esteem scores are higher in childhood. Therefore, it is assumed that interventions with outcome measures in self-esteem are more effective on secondary school students than on primary school students, because it is harder to achieve effectiveness in a group that already scores high on the targeted outcome. The third hypothesis therefore runs as follows:

Positive school-based interventions with outcomes in self-esteem are more effective on secondary school students than on primary school students.

2. Method

The method section begins with describing the literature search and the selection of studies concerning the systematic review. After that it is described how the methodological quality of selected studies was assessed. In the end the meta-analysis is explained in detail.

2.1 Literature search

The literature search followed Van der Linden (2012) and the update by Bolier (2013) and therefore the inclusion criteria are in accordance with them:

(1) studies that investigate positive school-based interventions. A positive school-based intervention is in this work defined as an intervention that aims to promote resilience and well-being of students.

(2) studies that measure at least one positive outcome measure. Four positive outcome measures are included: resilience, psychological well-being, social and emotional skills and subjective well-being.

(3) studies that investigate universal school-based interventions. In a universal school-based intervention any student is included. Differences in intelligence, skills or problems are neglected.

(4) studies that describe a controlled effect study. There has to be a control group and the effects of the intervention have to be compared to a control group that did not follow the intervention.

(5) studies that are published in a 'peer-reviewed' journal.

The search items that were used can be seen in Table 2.1. The literature search concentrated on three computerized databases: PsychInfo, PubMed and ERIC. Van der Linden (2012) has investigated the period from January 2000 till December 2011. She included 23 studies in her meta-analysis. Further, an update was done by Bolier (2013) covering the months January 2012 till April 2013. Based on this update another nine studies were included in the data set. The study at hand concentrated the literature search on the period from May 2013 till March 2014. Complete search histories for the current study can be found in Appendix A.

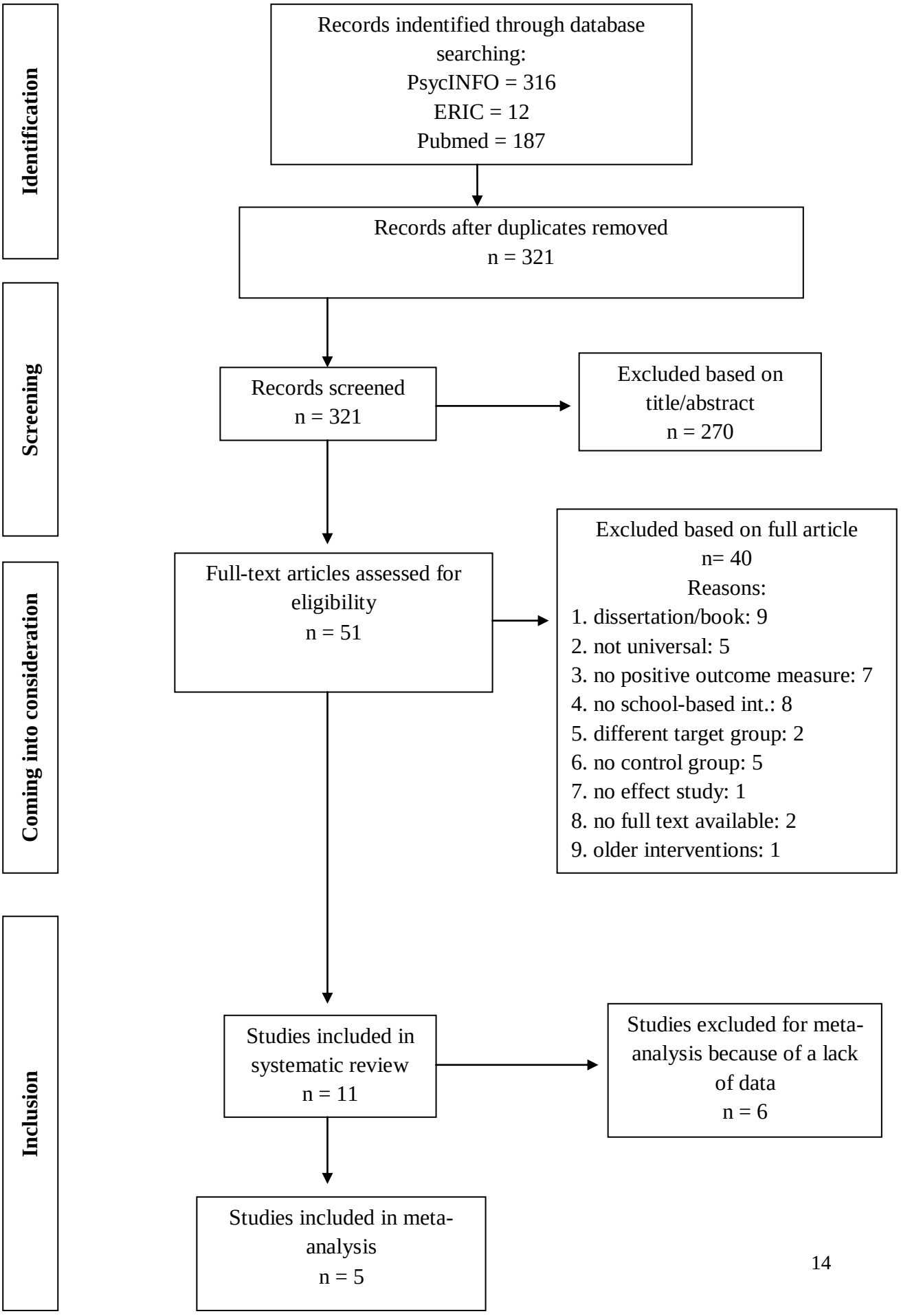
Table 2.1 Search items

Criteria	Search terms/ terminology
positive	happiness, life satisfaction, well being, positive psychology, resilience, flow, optimism, strength, strength-based approach, subjective well being.
school-based intervention	school based intervention, school counseling, educational programs, after school programs, educational program evaluation, classroom intervention.
effect study	effect, pilot, implement, treating, treatment, therapy, outcome, evaluation.
limiters/expanders	Published Date: May 2013-March 2014; Language: Dutch, English; Methodology: -Follow-up Study, -Longitudinal Study, -Systematic Review, -Meta Analysis, treatment outcome/clinical trial

2.2 Selection of studies

In the following the study selection of the present study is described in more detail. In general 515 studies were found in the first identification phase. After removing duplicates, 321 studies were left. These were screened based on title and abstract and those that met the inclusion criteria were retrieved and studied full-text (n=51; Appendix B). Further, the reference lists of retrieved studies were examined and those that met the inclusion criteria were taken under close consideration. Based on the full-text examination, 40 studies were excluded. Thus, in general 11 studies were included in the systematic review. A flow chart of the study selection can be found below (Figure 2.1).

Figure 2.1: Flowchart of study selection



The selection of studies was based on an independent screening of two researchers: Renée Koks (RK) and Franziska Geesen (FG). As described above, the first phase consisted of identification based on title and abstract. In the second phase studies were investigated full-text. All studies that were identified in the first phase as suitable for the literature review by one of the two researchers were included in the second phase and investigated full-text. Disagreement was solved by consensus.

Concerning the percentage of agreement, a value of 0.88 was reached, which can be seen as a high agreement between RK and FG. Also these two researchers gained a high agreement with Van der Linden, which is reflected in a percentage of 0.83.

2.3 Coding of study quality

This work follows Van der Linden (2012), who assessed the methodological quality on the basis of five criteria assessed by the Cochrane Collaboration (Higgins and Green, 2005).

Firstly, the implementation of the intervention is important. The more strictly the planned execution of the intervention is followed, the higher the methodological quality of the study. If the strictness of implementation is measured and higher than 0.70, the study scores 1 on this first criterion.

Secondly, randomization of the subjects is essential for the methodological quality. If students are assigned randomly to the conditions, the study achieves the score 1.

Thirdly, it is important that there are no significant baseline differences between the experimental group and the control group. If there are baseline differences between the two groups, but these are not discussed or solved, the study scores 0 on this criterion. A score of 1 can be achieved if baseline differences are taken seriously and are solved.

Fourthly, blinding to the subjects is important for the methodological quality. This means that the experimental group is not aware that they are following an intervention.

Fifthly, when students drop out during the intervention, this drop-out has to be analyzed. If there is a significant difference between the students that dropped out and the ones that kept following the intervention, there has to be found a solution in order to keep the quality of the study high. Studies score 1 if they consider the difference and search for a solution.

An overview of the coding of study quality can be found in Appendix E. The quality of studies was assessed by two independent researchers (RK and FG).

2.4 Meta-analysis

Operationalization of moderator 'target group'

The hypotheses at the end of the introduction refer to two different target groups. The moderator target group can be classified in two subgroups based on school form: primary school students and secondary school students.

Operationalization of self-esteem

Self-esteem as an outcome measure can be further operationalized as can be seen in Table 2.2. This classification was done based on a close consideration of the outcome measures in Van der Linden's (2012) literature review.

Table 2.2 Operationalization of self-esteem

Self-esteem
acceptance of the self
self-perception
assertiveness
self-worth
positive feelings over oneself

Classification of studies

Together with the studies from Van der Linden (2012) and Bolier (2013) the data set of the systematic review consists of 40 studies. The study at hand was directed at resilience and at the two outcome measures coping and self-esteem, which are seen as elements of resilience. Therefore all studies in the systematic review were scanned for outcome measures in one of these three concepts. If a study measured one or more of these outcome measures, it was included in the meta-analysis. Based on this, from the total of 40 studies, 19 studies were included in the meta-analysis. A full overview of the classification of studies can be found in Appendix C next to the exact data that were used for the analysis (Appendix D).

Cohen's d

Effect sizes of studies were calculated in two different ways. When randomization was done, the average score of the control group was subtracted from the average score of the experimental group (at post-test) and divided by the pooled standard deviations of both groups. If no randomization was done, the effect sizes were calculated on the basis of the differences between pre- and post-test. For the experimental and the control group separately the differences between pre- and post-test were calculated and the difference between the resulting scores is the effect size. Stated practically, an effect size of 0.5 indicates that the mean of the experimental group is half a standard deviation larger than the mean of the control group. If the means or standard deviations were not reported in the studies, other statistics were used to calculate effect sizes (t value, p value). Effect sizes that are ≥ 0.56 are considered to be large, while effect sizes of 0.33–0.55 are moderate and effect sizes lower than 0.33 are small (Lipsey, 1990).

Analysis

The analysis was done using the program Comprehensive Meta-analysis (CMA, Version 2.2.021). To begin with, mean effect sizes were built. The mean effect size of interventions that promote resilience in general were calculated. For that, all studies with outcome measures in resilience, coping and self-esteem were taken together. If in one study different outcome measures were separately calculated (n= 10), these outcomes were taken together and the mean effect size was built so that each study is allocated to one effect size. Further, effect sizes for interventions aimed at coping and self-esteem respectively were calculated in similar manner.

The analysis as such consists of two parts. In the first part, the statistical heterogeneity is estimated using the Q-test and the I^2 statistic (Higgins & Thompson, 2002). A significant Q rejects the null hypothesis of homogeneity and thus indicates that effect sizes differ between studies. However, the discrimination of Q-tests is rather weak (Whitehead and Whitehead, 1991), therefore the I^2 statistic is included. The I^2 is a percentage that indicates the variance of studies based on heterogeneity. It can be stated that the higher the percentage of the I^2, the stronger the degree of heterogeneity (Higgins, Thompson, Deeks & Altman, 2003). As a rule of thumb, an I^2 value of 25% can be seen as low heterogeneity, while 50% is moderate and 75% is a high heterogeneity (Cuijpers et al., 2010). Based on the Q-test and the I^2 it is decided

whether the fixed or the random model is handled. The fixed model on the one hand assumes that there is one fixed value for the real effect and that differences between effect sizes in different studies depend on chance. Therefore if the Q is not significant and the I^2 shows that there is little variance between the studies, homogeneity can be assumed and the fixed model is used. The random model on the other hand supposes that differences in effects between studies are normal. Thus, if based on Q-test and I^2 statistic heterogeneity can be assumed, the random model is used. According to Hedges and Vevea (1998) the main difference between fixed and random model is that using the fixed model, conclusions can only be applied to studies that were included in the analysis, while using the random model, conclusions can be generalized.

In the second part, subgroup analyses were conducted in order to investigate the hypotheses. For the first hypothesis (‘*Positive school-based interventions aimed at promoting resilience are more effective on primary school students than on secondary school students.’)* the Cohen’s d of interventions that promote resilience were compared between the two subgroups of primary and secondary school students.

Considering the second hypothesis (‘*Positive school-based interventions with outcomes in coping(strategies) or problem solving skills are more effective on primary school students than on secondary school students.’),* interventions that are aimed at coping were investigated. The effect sizes of these interventions were compared for the two different subgroups.

The last hypothesis was directed at self-esteem (‘*Positive school-based interventions with outcomes in self-esteem are more effective on secondary school students than on primary school students.’).* Therefore the effect sizes of all interventions aimed at self-esteem were taken together and compared for the two subgroups of primary and secondary school students.

Further, based on same subject matters, studies were taken together in clusters. In order to investigate and compare the effectiveness of these different clusters, pooled mean effect sizes were calculated.

Lastly, in order to investigate the possible risk of publication bias, a funnel plot concerning the studies of the meta-analysis was done. Since the visual examination of the funnel plot sometimes lacks validity, Egger’s regression test was used (Egger et al., 1997) in order to investigate funnel plot asymmetry, which is seen as an indication for publication bias.

3. Results

3.1 Systematic review

In general 40 studies were included in the systematic review as can be seen in Table 3.1. Studies that were included in the meta-analysis are marked with * (n= 19). The characteristics of these studies are described in the following.

It can be seen that studies from all over the world were included. In general 14 different countries are represented. Most studies come from the USA (n=6), however, also studies from smaller countries are included, such as Lithuania or Israel for instance.

Further, Table 3.1 shows that the aims of the interventions in this meta-analysis are quite diverse and some goals are more broadly described than others. De Villiers (2012) for instance describes the goal of the program 'Strengths in Motion' quite broadly: Promotion of resiliency. While Broderick (2009) defines the goals more precisely by stating that the intervention Learning to BREATH aims to promote emotional balance, help to understand thoughts and feelings and learn mindfulness tools.

All interventions are interactive; discussions, brainstorming sessions or breathing exercises are used for instance. Further, all interventions are given in sessions; however, concerning the duration great differences exist. Bird (2014) for example discusses 'Happy Being Me', a school-based body image intervention, which consists of three sessions in three weeks. In contrast, the school dog-teacher-team intervention lasts one year, with one day per week (Beetz, 2014).

Further, some of the included studies can be classified in clusters of similar subject matters. One cluster for instance consists of studies that discuss foreign meditation techniques such as Yoga or Qigong (Khalsa, 2012; Noggle, 2012; Terjestam 2010). Another cluster of studies that is important to discuss deals with the intervention 'Zippy's friends' (Clarke, 2010; Holen, 2012; Mishara, 2006). The last cluster that deserves mentioning is the cluster of studies that make use of optimism and positive thinking (Cunningham, 2002; Marques, 2011; Owens, 2013). The effectivity of these different clusters is discussed in paragraph 3.4.

The methodological quality of studies is overall quite low. As can be seen in Appendix E no study in the meta-analysis reached a score higher than 3.

Table 3.1 selected characteristics of studies

Study (first author & year)	Land	Name of intervention	Aim intervention	Target group (mean age)	Target group (school form)	Number of sessions /duration
Ashdown, 2012	Australia	You Can Do It! Early Childhood Education Program	Promotion of social-emotional development, well-being, and academic achievement	-	Preparatory-primary	10 weeks
*Beetz, 2013	Germany	School dog-teacher team	Improving socio-emotional experiences in school and emotion regulation strategies, Prevention/ improving of depression	8.5	primary	1 year (1 day per week)
*Bird, 2013	UK	Happy Being Me, school-based body image intervention	Promotion of body satisfaction and self-esteem, prevention of risk factors for negative body image	10-11	Primary	3 sessions, 3 weeks (per 1 hour)
*Broderick, 2009	USA	Learning to BREATHE	Promotion of emotional balance, helping to understand thoughts and feelings, learning of mindfulness tools	17.4	secondary	12 sessions, 6 weeks (2x per week, 32-43 min)
*Clarke, 2010	Ireland	Zippy's friends	Learning to deal with setbacks by developing social-emotional skills	7.3	primary	25 sessions (1x per week)
*Cunningham, 2002	USA	Bright Ideas: skills for optimistically thinking	Promotion of coping skills through positive thinking	11.4	primary	8 weeks (60-90 min)
deVilliers, 2012	South Africa	Resiliency Program	Promotion of resiliency	11-12	secondary	15 sessions, 3 weeks
Domitrovich, 2002	USA	PATHS' curriculum	Developing self-esteem and communication about own and other's emotions. Creating positive class atmosphere	4.3	pre	30 sessions (1x per week)
Dufour, 2011	Canada	Zippy's friends	Learning to deal with setbacks by	6.72	primary	24 sessions, 24 weeks

			developing social-emotional skills			(50 min)
Frey, 2005	USA	Second Step social-emotional learning program	Promotion of pro-social behavior and reducing anti-social behavior	9	primary	23 weeks (1x per week, 25-40 min)
*Firth, 2013	Australia	Success and Dyslexia (implementation in whole-class coping program)	Promotion of coping (with dyslexia)	10.6	primary	10 sessions, 12 weeks
Golan, 2013	Israel	'In Favor of Myself', Preventive Program to Enhance Positive Self and Body Image	Improving self-image, body image, eating attitudes and behavior; developing coping strategies to help adolescents resist media-based messages	13.52	secondary	8 sessions, 90 min
Grum, 2006	Slovenia	Enhancing mental health program	Enhancing of mental and emotional health	13	secondary	36 hours
Halliwell, 2014	UK	Dissonance Body Image Intervention	increase girls' resilience to thin-ideal media, reducing self-reported dietary restraint, thin-ideal internalization, and body dissatisfaction.	12.07	secondary	4 sessions, 4 weeks (20 min)
Hennessey, 2007	USA	The open circle program	Learning and practicing to communicate, social-problem skills	9.2	primary	35 sessions (2-3 x per week, 15 min)
*Holen, 2012	Norway	Zippy's friends	Learning to deal with setbacks by developing social-emotional skills	7.3	primary	24 weeks (1x per week)
Humphrey, 2010	UK	Going for Goals	Motivation and self-esteem: teaches students to be responsible for learning and goal-oriented behavior	8	primary	8 sessions, 8 weeks (1x per week, 45 min)
Huppert, 2010	UK	Mindfulness training	Promotion of mindfulness	-	-	4 weeks (1x per week, 40 min)
*Khalsa, 2012	USA	Yoga	Promotion of psychological benefits of	16.8	secondary	11 weeks (1-2 x per

			using Yoga			week, 30-40 min)
Kuyken, 2013	UK	School-based universal mindfulness intervention	Enhancing mental health and well-being, lessening stress and depression	14.9	secondary	9 weeks, 9 lessons
Lee, 2013	Australia	'Health-promoting school' model (HPS), resilience intervention	Using multiple systematic interventions to effectively address risk and protective factors within the school setting and benefit students' development of resilience	10.05	primary	2 years
Lynch, 2004	USA	Al's pals: kids making healthy choices	Promotion of protecting factor of social-emotional competence, lowering of risk-factors	4.4	pre	46 sessions, 24 weeks (2x per week, 15-20 min)
*Marques, 2011	Portugal	Building hope for the future	Promotion of hope, life satisfaction, self-esteem, mental health, academic achievement	10.9	secondary	5 sessions, 5 weeks (1x per week, 60 min)
*Mishara, 2006	Denmark/ Lithuania	Zippy's friends	Learning to deal with setbacks by developing social-emotional skills	7.4	primary	24 sessions (1x per week)
Monkeviciene, 2006	Lithuania	Zippy's friends	Learning to deal with setbacks by developing social-emotional skills	8	primary	26 sessions (1 per week)
*Noggle, 2012	USA	Kripalu-based Yoga Program	Promotion of psychosocial well-being	17.1	secondary	28 sessions, 10 weeks
*Owens, 2013	USA	Best Possible Selves	Promoting positive self-image	7.35	primary	1x per week
*Proctor, 2011	UK	Strengths Gym	Promotion of character strength and life satisfaction	12.98	secondary	6 months, 24 lessons
*Rawana, 2011	Canada	Strengths in Motion, strength-based bullying prevention program	Prevention of bullying	11.04	primary	XXX

Richards, 2008	UK	Positive Psychology Intervention Program	Developing and using of individual strengths en qualities in social context	11.6	secondary	9 weeks (1x per week)
Ruini, 2006	Italy	Well-being therapy	Prevention of psychological trouble end promotion of well-being	15	Secondary	8 weeks (4x2 hours in week)
*Ruini, 2009	Italy	Well-being therapy	Promotion of psychological well-being	14.4	secondary	6 weeks (1x per week, 120 min)
*Schonert-Reichl, 2010	Canada	Mindfulness Education	Promotion of well-being and mindfulness	11.4	secondary	10 weeks (1x per week, 40-50 min)
Seligman, 2009	USA	Positive Psychology Program	Helping students to find and use their strengths; Promotion of resilience and positive emotions	-	-	20-25 sessions (80 min, over one schoolyear)
*Shoshani, 2013	Israel	positive psychology school-based intervention	Enhancing mental health and empowering	13.68	secondary	1 year, every two weeks (15 sessions)
Standage, 2013	UK	Be the Best You Can Be (BtBYCB)	Fostering positive physical, psychological, and social development via empowering young people to take ownership over their own personal development	11-13	secondary	13 sessions
Suldo, 2013	USA	Wellness-promotion intervention	Improving students' mental health	11.43	secondary	10 weeks
*Terjestam, 2010	Sweden	Qigong	Promotion of well-being, lessening of stress and using of Qigong as coping strategy	13.2	secondary	8 weeks (2x per week, 25 min)
*Tomba, 2010	Italy	Well-being therapy/ Anxiety Management	Promotion of psychological well-being and lessening of stress	11.4	secondary	6 weeks (1x per week, 120 min)
Witt, 2005	Germany	Qigong	Improving of achievement in school, social behavior, health	10.7	secondary	6 months (2x per week, 20 min)

3.2 Overall effects

In Table 3.1 firstly the overall effects of interventions aimed at resilience in general can be seen. Concerning the test of heterogeneity, a significant p was found (p= 0.000; Q= 58.713), indicating that the null hypothesis of homogeneity can be refused. In accordance with that the high I^2 of 69.342 also declares heterogeneity. Hence, the random effects model is used in this context. The random effect is 0.240.

Secondly, the mean effect of interventions aimed at coping and problem-solving skills are displayed in Table 3.1. The test of heterogeneity shows that heterogeneity can be assumed (p= 0.000; Q= 28.331). The I^2 of 85.881 even shows that the heterogeneity is strong. Thus, concerning the effects of interventions aimed at coping and problem-solving, the random effect is taken into account, which is 0.270.

Lastly, Table 3.1 shows the mean effects of interventions aimed at self-esteem. It can be seen that a Q-score of 29.27 with a p-score of 0.001 was found indicating heterogeneity. In accordance the I^2 of 52.173 indicates moderate heterogeneity. Hence, in the context of interventions aimed at self-esteem the random effects model is used. The random effect is 0.217.

Table 3.1 Overall effects

Outcome measure	n	Studies		Effect size				Z-test		Heterogeneity				
				Cohen's d	Std. error	Lower limit	Upper limit	Z	p	Q	df (Q)	p	T^2	I^2 in %
resilience	19	Beetz 2013, Bird 2013, Broderick 2009, Clarke 2010, Cunningham 2002, Firth 2013, Holen 2012, Khalsa 2012, Marques 2011, Mishara 2006, Noggle 2012, Owens, 2013 Proctor 2011, Rawana 2011, Ruini 2009, Schonert-Reichl 2010, Shoshani, 2013, Terjestam 2010, Tomba 2010	Fixed	0.176	0.021	0.134	0.217	8.307	0.000	58.713	18	0.000	0.023	69.342
			Random	0.240	0.048	0.146	0.334	4.989	0.000					
coping/ problem-solving	5	Clarke 2010, Cunningham 2002, Firth 2013, Holen 2012, Mishara 2006	Fixed	0.183	0.026	0.131	0.234	6.987	0.000	28.331	4	0.000	0.032	85.881
			Random	0.270	0.090	0.093	0.447	2.994	0.003					
self-esteem	14	Beetz 2013, Bird 2013, Broderick 2009, Khalsa 2012, Marques 2011, Noggle 2012, Owens, 2013,Proctor 2011, Rawana 2011, Ruini, Schonert-Reichl 2010, Shoshani, 2013,Terjestam 2010, Tomba 2010	Fixed	0.152	0.037	0.080	0.224	4.143	0.000	29.272	13	0.010	0.025	52.173
			Random	0.217	0.062	0.096	0.338	3.526	0.000					

3.3 Subgroup analyses

Table 3.2 shows the subgroup analysis for interventions aimed at resilience. It can be seen that the effect size for primary school students is higher than the effect size for secondary school students. It can also be seen that this difference in effect sizes doesn't reach significance.

Concerning the first hypothesis ('*Positive school-based interventions aimed at promoting resilience are more effective on primary school students than on secondary school students.'),* it can be stated that the data does not confirm this hypothesis. No significance is reached and thus, no confident conclusion can be drawn.

Table 3.2 Subgroup analysis: resilience (total)

Moderator	Subgroup	n	Cohen's d	Lower limit	Upper limit	Subgroup differences Q	df	sig
target group	primary school	9	0.291	0.146	0.436	0.926	1	0.336
	secondary school	10	0.194	0.057	0.330			

The results for the subgroup analysis of the outcome measure coping/problem-solving skills are displayed in Table 3.3. It can be seen that the effect score for interventions aimed at primary school students is small. Concerning secondary school students no results are displayed, because of a lack of data.

Concerning the second hypothesis ('*Positive school-based interventions with outcomes in coping(strategies) or problem solving skills are more effective on primary school students than on secondary school students.'),* it can be stated that data suggests that the effects on primary school students are small. However, no statement can be made about the effect on secondary school students, because not enough data was available. Thus, since no comparison between the effect sizes of the two subgroups can be made, no confident conclusion concerning the second hypothesis can be drawn.

Table 3.3 Subgroup analysis: coping (problem-solving)

Moderator	Subgroup	n	Cohen's d	Lower limit	Upper limit	Subgroup differences Q	df	sig
Target group	primary school	5	0.270	0.093	0.447	0.000	0	1.000

Table 3.4 displays the results from the subgroup analysis concerning interventions aimed at self-esteem. It can be seen that the effect size for primary school students is higher than for secondary school students. However, the Q-score indicates that this difference doesn't reach significance. Further, as can be seen in Figure 3.1 the 95% confidence interval is larger for effect sizes of primary school students [0.146- 0.578] compared to secondary school students [0.047-0.312].

Hence, concerning the third hypothesis ('*Positive school-based interventions with outcomes in self-esteem are more effective on secondary school students than on primary school students.')* it can be noted that the data does not confirm this hypothesis, since no significance was reached. Further, the effect size for primary school students is higher, indicating that interventions aimed at self-esteem in this meta-analysis are possibly more effective on primary school students. However, the 95% CI indicates that the range of effect sizes for primary school students is high.

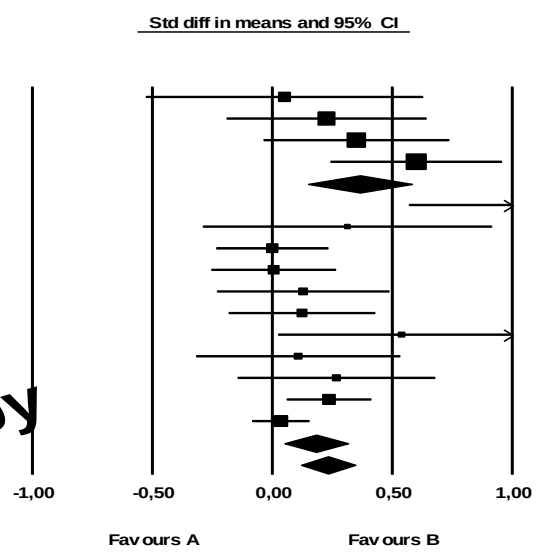
Table 3.4 Subgroup analysis: self-esteem

Moderator	Subgroup	n	Cohen's d	Lower limit	Upper limit	Subgroup differences Q	df	sig
Target group	primary school	4	0.362	0.146	0.578	1.998	1	0.158
	secondary school	10	0.179	0.047	0.312			

Figure 3.1 Subgroup analysis: self-esteem

Group by schoolform	Study name	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
primary	Beetz	0,051	0,296	0,088	-0,529	0,631	0,172	0,864
primary	Bird, gesamt	0,226	0,214	0,046	-0,193	0,645	1,056	0,291
primary	Rawana	0,351	0,199	0,039	-0,039	0,740	1,765	0,078
primary	Owens	0,599	0,184	0,034	0,240	0,959	3,265	0,001
primary		0,362	0,110	0,012	0,146	0,578	3,288	0,001
secondary	Marques	1,101	0,273	0,074	0,567	1,635	4,040	0,000
secondary	Noggle 1	0,313	0,309	0,095	-0,292	0,919	1,014	0,311
secondary	Proctor	0,000	0,120	0,014	-0,236	0,236	0,000	1,000
secondary	Ruini	0,006	0,134	0,018	-0,257	0,268	0,041	0,967
secondary	Terjestam	0,129	0,185	0,034	-0,233	0,491	0,697	0,486
secondary	Tomba	0,123	0,157	0,025	-0,185	0,432	0,785	0,433
secondary	Broderick	0,539	0,264	0,070	0,022	1,056	2,042	0,041
secondary	Khalsa 1	0,108	0,218	0,048	-0,320	0,536	0,494	0,621
secondary	Khalsa 2	0,267	0,211	0,045	-0,147	0,682	1,265	0,206
secondary	SchonertR gesamt	0,236	0,091	0,008	0,058	0,414	2,593	0,010
secondary	Shoshani	0,035	0,062	0,004	-0,086	0,157	0,571	0,[illegible]
secondary		0,179	0,067	0,005	0,047	0,312	2,660	0,008
Overall		0,229	0,058	0,003	0,116	0,[illegible]	[illegible]	0,000

Statistics for each study



Evaluation copy

3.4 Effectiveness of clusters

As has been described above, the studies that are used in the meta-analysis can be classified in clusters. An overview can be seen in Table 3.5. The fixed effects are displayed, because homogeneity can be assumed.

Table 3.5 effect sizes of clusters

Cluster	Studies	Effect sizes
Yoga/Qigong	Khalsa 2012, Noggle 2012, Terjestam 2010	0.244
Zippy's friends	Clarke 2010, Holen 2012, Mishara 2006	0.136
Optimistically Thinking	Cunningham 2002, Marques 2011, Owens 2013	0.607

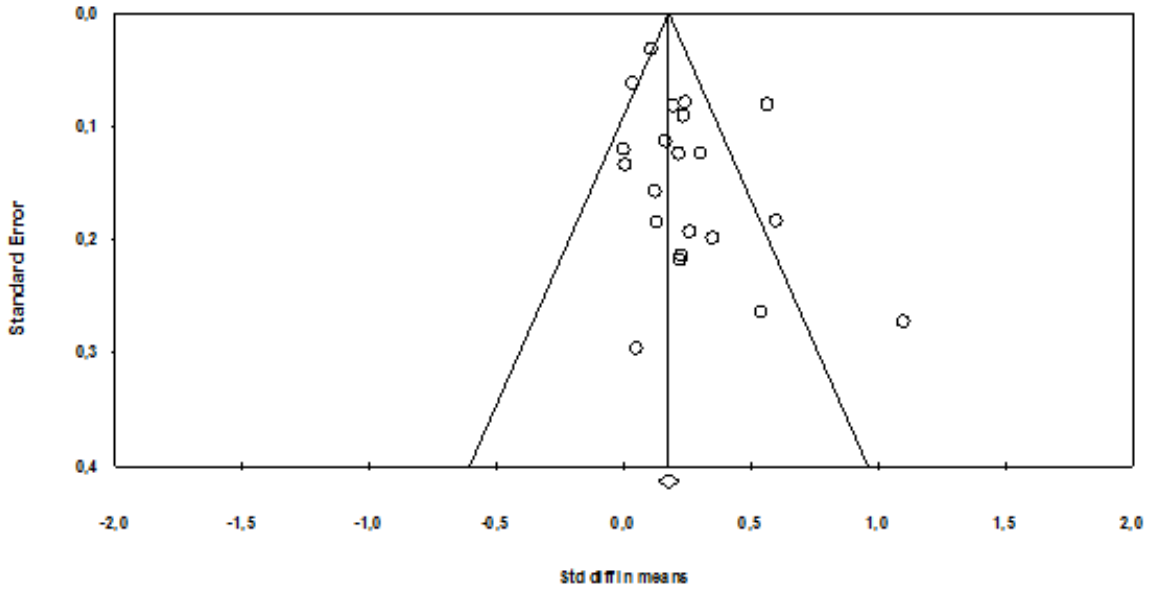
Taking a look at the effects, it can be concluded that interventions with the topic of optimistically thinking are most effective (SE 0.072; 95% CI 0.467 – 0.747), while the two other clusters show lower effect sizes.

3.5 Publication Bias

Figure 3.2 shows the funnel plot of included studies. At first sight it can be seen that it is not symmetrical, which indicates publication bias. Four studies even lie outside the funnel. Next to this visual examination it was chosen to use a linear regression approach to measure funnel plot asymmetry (Egger et al., 1997). An intercept of 1.24 was found with a 95% CI from -0.04 to 2.52. The P value lies at 0.06. Thus, the intercept differs from 0, indicating asymmetry; however, the P value is not significant. Hence, based on the visual examination and the linear regression approach, no confident conclusion can be drawn concerning asymmetry of the funnel plot. It is important to note, though, that indications of asymmetry and thus of publication bias are found.

Further, four studies on the right are especially conspicuous with high effect sizes. These studies will be discussed more deeply in the following section.

Figure 3.2: Funnel plot



4. Discussion

The aim of the current study was to answer the following research question:

What effects do positive school-based interventions aimed at promoting resilience have on both primary school students and secondary school students?

By that it was striven for insight into the effectiveness of school-based interventions aimed at promoting resilience and to gain a more comprehensive knowledge of resilience. Also the current state of the art of positive psychology in the educational context was investigated.

Concerning the results it can be stated that for both primary and secondary school students the effects are small. An overall effect of 0.24 on resilience was found indicating a small effect (Cuijpers, 1990). With respect to this result a few things have to be taken into account.

First of all, taking a look at other meta-analyses about positive school-based interventions, it can be noted that similar small effect sizes are found. Van der Linden (2012) for instance found overall effects in the range from 0.287 to 0.420, which can be interpreted as small. And in a meta-analysis by Durlak et al. (2011), which investigated school-based interventions aimed to improve social and emotional learning, mean effects at post in the range from 0.22 to 0.57 were obtained. These effect sizes can be interpreted as small to moderate. Thus, the small effect sizes of the present study can be seen as a confirmation of the results of Van der Linden (2012) and Durlak et al. (2011).

Further, the universal character of included interventions has to be taken into account. It is important to note that both Van der Linden (2012) and Durlak (2011) used universal school-based interventions in their meta-analyses, which is in accordance with the current study. In a universal intervention all students are included and differences in intelligence, skills or problems are neglected. This means that also students that are already well adapted and able to cope effectively with stressors and adversities are included. The consequences for positive school-based interventions are that it is hard to reach great effects, because many students already show a high level of resilience or well-being. Thus, based on the universal character of the investigated interventions, small effects could be expected.

Lastly, it has to be pointed out that even small effects can have a great impact on the level of the general public. The study at hand investigated universal school-based interventions with the potential to reach and to have an impact on a large number of students.

Therefore the small effects of the current study may still be significant for a large student population.

In the following, the findings for each hypothesis are described separately in more detail and are related to findings in literature. The first hypothesis (‘*Positive school-based interventions aimed at promoting resilience are more effective on primary school students than on secondary school students.’)* was not confirmed by the data. Although the effect size for primary school students was slightly higher than for secondary school students, no significance was reached. Hence, no confident conclusion can be drawn from the current data.

Taking literature into account, it has to be noted that diverging results can be found. On the one hand many studies describe resilience as a developmental process (Noltemeyer & Bush, 2013; Masten, 2001; Egeland, Carlson & Sroufe, 1993) indicating that it should be more prevalent in secondary school students and thus interventions aimed at resilience should reach better effects in primary school students. On the other hand it was found that resilience is already quite common in young children. Flouri, Tzavidis and Kallis (2010) for instance investigated a large sample of three-year old children concluding that resilience is found even in these young children. With that in mind, it has to be considered whether the study of resilience should start even earlier than primary school. Probably it is interesting to include preschool or kindergarten children in the research in order to get a better insight into the early development of resilience.

Concerning the second hypothesis (‘*Positive school-based interventions with outcomes in coping or problem solving skills are more effective on primary school students than on secondary school students.’)* no statement can be made, because of a lack of data regarding secondary school students. The effect size for primary students was small.

Taking literature into account it has to be noted that findings are not consistent. As has already been mentioned in the introduction, some literature suggests that coping and problem-solving improves with age (Hampel, 2007; Williams, McGilicuddy-DeLisi, 1999; Spivak & Shure, 1985). However, other literature exists stating that more maladaptive coping can be observed in adolescence compared to childhood (Donaldson, Prinstein, Danovsky, & Spirito, 2000; Hampel & Petermann, 2005) and literature that reports that coping remains somewhat stable over time and no age differences are found (De Boo & Wicherts, 2009; Kirchner, Forns, Amador, & Damaris, 2010). Thus, future research is needed to settle this discussion.

The third hypothesis (‘*Positive school-based interventions with outcomes in self-esteem are more effective on secondary school students than on primary school students.’)*

was not confirmed by the data. The effect size for primary school students is slightly higher than for secondary school students, indicating that interventions aimed at self-esteem in this meta-analysis are possibly more effective for primary school students. However, the confidence interval for this effect size is quite large (cf. Figure 3.1) and no significance was reached, thus no confident conclusions can be drawn.

Taking literature into account, it has to be noted that most studies indicate that secondary school students have low self-esteem compared to primary school students (McKelvie, 2004; Marsh, 1989) and thus interventions aimed at promoting self-esteem should be more effective for secondary school students. Watkins, Dong and Xia (1997) even supported these results in a non-western sample by founding that self-esteem was lower in a group of Chinese children with a mean age of 13 compared to a group with a mean age of 10. It can be concluded that future research is needed to draw confident conclusions on this matter.

Concerning the second and third hypotheses, Moos (1990) stresses a relationship between self-esteem and coping. It was found that adolescents with low self-esteem relied more on emotion-based coping strategies, while adolescents with high self-esteem used more strategies that were directed at problem-solving (Moos, 1990). Hence, literature suggests that an interaction between self-esteem and coping and thus between different elements of resilience on the level of individual characteristics can be assumed (Moos, 1990; Chapman and Mullis, 1999). This assumption is in accordance with the statement that all dimensions of resilience are related to each other (Greenberg, 2006). In order to understand the full complexity and real-world implications of resilience, all dimensions have to be taken into account. It is even valid to assume that interactions between different dimensions are essential in the development of resilience. Egeland et al. (1993) for instance stress the importance of person-environment interactions in the context of resilience and Dumont and Provost (1999) found that social support can play a protective role on experiences of stress. Thus, it can be assumed that the quality of relationships with other people and the experiences in the external environment interact with each other in the context of resilience. In accordance with that Fraser, Kirby and Smokowski (2004) believe that resilience develops within an interactive model of risk factors and protective factors. Thereby the outcome of a risk factor is weakened by a protective factor. Thus, interactions between the different dimensions and elements of resilience seem to be of great importance. Therefore, the results concerning the different hypotheses in this work shouldn't be interpreted separately. Coping and self-esteem in the

context of resilience aren't detached; rather, they interact with each other. One possible consideration in this context is whether the low effects of interventions on self-esteem have influence on the effects on coping. According to Moos (1990) one could suggest that low self-esteem has influence on the coping strategy that is used. Based on the current study, only assumptions concerning this topic can be made. However, for future research it should be worthwhile to investigate how different coping strategies influence in self-esteem and vice versa. By that, the investigation of resilience gains utility and becomes more accurate.

Taking a look at the different clusters, it was found that interventions concerning the topic optimism/optimistically thinking are most effective compared to the two other clusters. However, it has to be noted that the three studies that are part of this cluster have conspicuously high effect sizes, which can also be seen in the funnel plot (cf. Figure 3.2). Taking a closer look at these studies, first of all it has to be noted that the methodological quality is relatively low with scores of 2 out of 5 possible points in all three studies. However, the quality of all included studies is quite low and, as will be discussed further below, the criteria for the assessment of study quality might be misleading in the context of the current study.

Secondly, it is noteworthy that the duration and the way of delivery of interventions in the cluster concerning optimism/optimistically thinking are similar. With durations in the range from five to six weeks, they can be described as moderately long. Also, the interventions were given in weekly sessions. Concerning the high effectiveness of these studies, it has to be considered whether this delivery schema and duration may be especially suited for positive school-based interventions. Future research has to investigate this topic.

Further, it important to mention that the cluster concerning the intervention Zippy's friends has the lowest effect. Taking into account that this intervention has taken 7 years to develop before being widely distributed to children **(**Mishara and Ystgaard, 2006), it is reasonable to assume that the effects would be higher (cf. Table 3.5). It is beyond the scope of the current paper to address this issue more deeply; however, future research should keep this finding in mind when investigating the effectiveness of Zippy's friends.

Concerning publication bias as indicated by the funnel plot (cf. section 3.5), no confident conclusion can be drawn, however, a few things have to be discussed. Firstly, it is important to note that in the current study mostly sub-results of included interventions are investigated such as resilience, coping and self-esteem. The studies of interest, however, had

most of the time also other outcome measures and thus other overall effects, that aren't covered in the current study. Hence, future research should investigate the funnel plot of included studies concerning the overall effects of the interventions.

Secondly, the statistical power of Egger's test is low with small numbers of studies (Higgins, 2008). The current study used 19 studies in the meta-analysis, which can be seen as a moderate quantity. However, the questionable power of the linear regression method must always be taken into account.

Thirdly, publication bias is not the only reason for asymmetry in the funnel plot. Egger et al. (1997) state that poor methodological quality can also lead to inflated effects in smaller studies. Concerning the results of the quality assessment of the current study (Appendix E) in which low scores were found, this issue could have played a role. However, the criteria for the assessment of study quality might be misleading in the context of the current study, which will be discussed more deeply below. Further, another reason for asymmetry of a funnel plot might be the population in which studies are conducted (Higgins, 2008). Some studies for instance may have been conducted in high risk populations where high effects can be reached, which leads to exaggerated effect sizes. The study at hand was concentrated at universal school-based interventions, in which all students are included. Thus, this issue probably doesn't play a role in the asymmetry of the current funnel plot. However, other factors such as true heterogeneity or the choice of effect measure (Egger et al., 1997) cannot be eliminated based on the current study. Future research should deal with that issue.

Further, the distribution of studies over the subgroups of primary and secondary school students in the current meta-analysis is noteworthy. All studies with outcome measures in coping were directed at primary school students (n= 5), while 10 from the 14 studies with outcome measures in self-esteem were directed at secondary school students. As has already been mentioned in the introduction, in general primary school students score lower on coping (Hampel, 2007; Williams, McGilicuddy-DeLisi, 1999; Spivak & Shure, 1985). Hence, the need for interventions aimed at promoting coping is higher in this group than in the group of secondary school students. Similarly, it can be stated that secondary school students score low on self-esteem (McKelvie, 2004; Marsh, 1989). Based on this, it can be argued that more interventions aimed at self-esteem are needed for secondary school students compared to primary school students. Thus, it can be concluded, that the distribution of interventions over the subgroups in this meta-analysis is in accordance with the expected needs. However, the expected needs are only a rough estimate of the real needs. Therefore, this observation should

also make attentive for a possible trend in which the development of interventions is only regulated based on general needs. There are always students who deviate from the majority and have different needs. However, if only interventions are given that cover the needs of the general public, minorities with other needs fall through the cracks. Therefore researchers should be aware of this possible risk and also keep an eye on the broader picture and needs of minorities.

Lastly, as has already been mentioned in the introduction, reasonable doubts can be formulated concerning the main hypothesis, which is based on the argument that resilience is a developmental process. It can critically be asked whether primary school students are yet able to show resilience. Concerning the results of the current study, it can be said that positive effects for the promotion of resilience in primary school students were found. No negative effect sizes were found and effect sizes in the range from 0.179 to 0.362 indicate a small but positive effect. Thus, it can be concluded that interventions aimed at promoting resilience in primary school students in this meta-analyses were effective, which shows that primary school students are even at young age able to show resilience. This statement is also affirmed by literature indicating that even preschool children show resilience (Flouri, Tzavidis and Kallis, 2010).

Further, concerning the developmental character of resilience, it can also be asked whether interventions to promote resilience in secondary school students are even necessary. Maybe resilience can be seen as a maturation process and sooner or later everybody develops it. The work at hand argues resolutely against this assumption. Although literature shows that resilience is quite common and people commonly demonstrate it (Masten, 2001), many examples can be found indicating that not everybody acts resilient even so it would be necessary. Many different studies state that children experiencing adversities and stress in their lives develop problem behaviors and psychological problems (Rogers & Pilgrim, 2010; Pearlin, 1989). Rogers and Pilgrim (2010) for instance describe in their book *A sociology of mental health and illness* the social causation approach, which stresses a relationship between social disadvantage and mental illness. Thus, it can be concluded that resilience is not natural per se and interventions aimed at promoting it are necessary and important.

Summing up, it can be said that the effects of interventions aimed at promoting resilience on both primary and secondary school students are small. Concerning the universal character of the used interventions and other meta-analyses on that topic, the current results

can be seen as a confirmation of earlier work. Also small effects with a great range can still have an impact on the student population as a whole.

With respect to the hypotheses, no significant differences in effect sizes between the two groups of primary and secondary school students were found. However, it has to be noted that in two of the three subgroup analyses effect sizes were slightly higher for primary than for secondary school students, suggesting that the interventions in this meta-analysis are possibly more effective on primary school students.

4.1 Limitations and future research

The study at hand has several limitations and weak points. First of all, as has been pointed out above, resilience is a multidimensional concept and this study focuses only at the first factor: the characteristics of the individual. Although this restriction was necessary and reasonable in the context of the current study, it draws an artificial line between the different dimensions of resilience. Hence, future research should aim to address this issue by investigating all dimensions of resilience and the interaction of these. Furthermore, the influence of these interaction effects on the development of resilience needs to be addressed.

Secondly, the conceptualization of resilience on the level of individual characteristics is not complete. Coping and self-esteem are certainly of great importance in the context of resilience but not exhaustive. Rather, a reasonable choice was made in this study. Taking a look at literature concerning this topic, other factors that promote or are part of resilience can be found. In Van der Linden's (2012) study for instance an overview of different factors of resilience is displayed in Table 2.4: Sociability, intelligence, communication skills and broader personal attributes all play a role in resilience. It can be assumed that the presence of these factors has a favorable influence on the development of resilience. Thus, future research that investigates resilience should aim to include all factors on the level of individual characteristics that are possibly influencing, in order to gain a more comprehensive and deeper understanding of resilience.

Further, it is important to note in this context, that the current study assumes that coping and self-esteem are elements of resilience and agrees thereby with Lee and Stewart (2013), who see resilience as build up of individual characteristics. In contrast to that, Van der Linden (2012) talks about factors that have a positive influence on resilience and thereby assumes that these factors are only related to resilience. Hence, the question is whether coping and self-esteem are elements of resilience or are related to it. This question cannot be

answered in the scope of the current study, however, future research needs to address this issue in order to fully understand the concept of resilience.

Thirdly, concerning the methodology of the meta-analysis a few problems have to be pointed out. To begin with, the quality of included studies was overall quite weak. As has already been mentioned in the results, no study scores higher than 3 on the methodological quality. This low quality can have influence on the results. Altman (2002) for instance states that one of the major reasons for overestimating the efficacy of an intervention is the inclusion of low-quality studies in meta-analyses. However, it is important to mention that the used criteria for assessing the quality have to be critically judged concerning that they were based on medical research. This work followed Van der Linden (2012) in order to make findings comparable and thus the five criteria from the Cochrane Collaboration (Higgins and Green, 2005) were used. One important factor according to them is blinding to the subjects. However, it can be stated that this factor is not applicable in the context of school-based interventions. It can also be seen in Appendix E that all studies scored 0 in this criterion. Also no study investigated the strictness of implementation. Thus, it can be assumed that due to the used criteria the results on the assessment of study quality were distorted. Future research should deal with that by using other criteria that are more appropriate in the context of school-based intervention. One possibility is shown in a meta-analysis by Bohlmeijer et al. (2010; p.541) about the effects of mindfulness-based stress reduction therapy. It can be seen that the coding of study quality is based on both the criteria proposed by the Cochrane Collaboration and an authoritative review of empirically supported psychotherapies (Chambless & Hollon, 1998). Thus the quality assessment is tailored to the context of the study and by that a valid picture of the methodological quality of included studies is obtained (Bohlmeijer et al, 2010).

Lastly, because of the lack of follow-up data in many studies, it was not possible to investigate long-term effects of the interventions. Future research has to deal with this topic in order to get to know the effectiveness of interventions on the long term.

4.2 Implications for the future

This study is only a first step in the investigation of resilience in the educational context. However, it gives an outlook on the current state of the art of positive psychology in the educational system and supposes that future research should pursue this way in order to gain a more comprehensive knowledge of resilience and to improve students' mental health.

One important point for future research is the definition of resilience. The current study has used the broad definition of resilience by Norman (2002): a successful adaptation to adverse conditions. However, McCubbin (2001) describes problems and confusion that goes along with the term resilience. According to him resilience has become an umbrella term to refer to many different dimensions such as personal characteristics, the environment and risk and protective factors. Thereby the term is used variably and in different contexts, which leads to confusion and controversy (McCubbin, 2001). Thus, future research on resilience should address this issue and find a clear cut definition for resilience in order to make it a valid and unambiguous construct. By that the utility and thus the empirical investigation of resilience can be enhanced.

Further, the endeavor to promote resilience in students should not be restricted to the students themselves. Rather, the school as a whole including all school-staff should be taken under consideration for positive psychological interventions. Most interventions of the current meta-analysis for instance are led by teachers indicating that this occupational group cannot be ignored. Goldstein and Brooks (2005) point to the importance of resilience in teachers. They state that the effectiveness of teachers in promoting resilience in students is directly influenced by the resilience of the teachers themselves. Since teachers are obligated with a long list of responsibilities, promoting resilience in their students may be a new stressor and may therefore work against their own resilience. Thus, Goldstein and Brooks (2005) conclude that in order to promote resilience in students, it should also be ought to promote resilience in teachers. Hence, this is one example of including the whole school context into the promotion of resilience in students. Other topics might be more systematically by investigating how the system of the school can be changed to promote resilience.

Furthermore, Noltemeyer and Bush (2013) stress another important point in the context of resilience. They note that resilience is also strongly influenced by culture and context. Although some commonalities beyond national borders can be assumed, evidence exists that there are also cultural differences (Ungar, 2008). In this context it is important to make oneself aware that some types of risk factors as well as protective factors are localized to particular social or cultural systems. Further, it can also be argued that people's perceptions and interpretations of adversities are influenced by their cultural beliefs and thus these cognitions play an important role in resilience (Lee, Kwong, Cheung, Ungar, & Cheung, 2010). Hence, future research needs to investigate these cultural differences in the context of resilience more deeply in order to gain insights into the practical implications of these for the educational system.

Further, the current study has investigated universal interventions that included any student. However, even though these universal interventions have their place and are perfectly suited for reaching a large number of students; it should also be considered to tailor school-based interventions to certain risk groups. Students that face early adverse life experiences, for instance, could be targeted and supported by interventions. Research suggests in this context that stress accumulates over the life course (Pearlin, 2006) which might affect those the most that show lower levels of resilience to begin with. This means that even small differences in resilience in childhood might accumulate to greater disadvantages over the life course, which stresses the importance of early tailored interventions on risk groups. Also interventions can be perfectly tailored to the needs of the respective target group, which improves intervention's effectiveness.

Further, the current study has used the moderator 'school form' in order to differentiate between the effects on primary and secondary school students. However, many other moderators are also possible. Concerning coping, for instance, Spirito, Williams and Guevremont (1989) state that gender plays an important role. They found that male adolescents used more wishful thinking in their coping strategies compared to female adolescents, while female adolescents relied more on social support as a coping strategy. Thus, gender has influence on the way coping strategies are used and is therefore another interesting moderator that should be investigated in future research on resilience. With the characteristics of included studies in mind, another interesting moderator could be the duration of interventions. As has been described above, the studies of the current meta-analysis differ greatly concerning the duration of interventions. A reasonable question in this context is whether the duration has influence on the effectiveness of interventions. Future research should investigate this topic more deeply. Another worthwhile investigation could deal with the influence of personality traits in the development of resilience. The important question in this context is: Why do some people develop resilience and others not? Maybe personality plays a role. By using the Big Five personality traits as moderators, this issue can be addressed. Hence, it can be concluded that next to school form many other interesting moderators can be investigated such as gender, duration of interventions and personality for instance.

Further, with the development of resilience in mind, longitudinal studies are interesting. Following students over longer periods of time and investigating how resilience develops in them should give insights into the development process and factors that promote

or hinder it. After all, knowing how resilience develops is the precondition for successfully promoting it in students.

Lastly, it is important to point out that the study at hand is exploring rather than producing. Using a meta-analysis it was investigated how effective positive school-based interventions aimed at resilience are. However, this investigation says little about how and what actions need to be taken in order to improve the impact of interventions. Therefore, for the future not only exploring studies are needed, but also studies that investigate real world changes in interventions and their impact on the effectiveness. Only by that, the step to the real world can be made in order to create an actual change in students' lives.

4.3 Conclusion

In summary, the current study has shown that the effectiveness of school-based interventions aimed at promoting resilience is small for both primary and secondary school students. Concerning the universal character of the used interventions and other meta-analyses on that topic, the current results can be seen as a confirmation of earlier work. Also small effects with a great range can still have an impact on the student population as a whole.

Further, no significant differences in effect sizes between the two groups of primary and secondary school students were found. However, it has to be noted that in two of the three subgroup analyses effect sizes were higher for primary school students, suggesting that the interventions in this meta-analysis were possibly more effective on primary school students.

Future research is needed in order to draw confident conclusions and to broaden our knowledge of resilience. One important question in this context concerns the possible interactions between different dimensions and elements of resilience and the influence of these on the developmental process. Further, practical considerations have to be addressed in the future such as what delivery schema and duration is best suited for the educational context. Also in order to investigate the developmental process of resilience, longitudinal studies should be conducted.

Promoting resilience in students will make them more capable to deal with live strains that everyone will have to face sooner or later. We cannot keep students from facing problems and serious stressors, but we can make them more ready to deal with these. By that they can grow and develop into happy, capable adults. A quote by H. Jackson Brown captures this quite nicely: '*Happiness is not the absence of problems but the ability to deal with them'.* On this note, the current study advocates the promotion of resilience and the application of positive psychology in the educational context.

Literature

Altman, D. G. (2002). Poor-quality medical research: What can journals do?. *Jama, 287* (21), 2765-2767.

American Psychological Association (2014). *The Road to Resilience*. Retrieved March 31, 2014, from http://www.apa.org/helpcenter/road-resilience.aspx.

Anderson, V., Anderson, P., Northam, E., Jacobs, R., & Catroppa, C.(2001a). Development of executive functions through late childhood and adolescence in an Australian sample. *Develop-mental Neuropsychology*, 20(1) , 385–406.

Anderson, V., Northam, E., Hendy, J., & Wrenall, J. (2001b). Developmental neuropsychology: A clinical approach. *NewYork: Psychology Press*.

*Beetz, A. (2013). Socio-emotional correlates of a schooldog-teacher-team in the classroom. *Frontiers In Psychology, 4*.

Benard, B. (1995). Fostering Resilience in Children. ERIC Digest.

*Bird, E. L., Halliwell, E., Diedrichs, P. C., & Harcourt, D. (2013). Happy Being Me in the UK: A controlled evaluation of a school-based body image intervention with pre-adolescent children. *Body Image*, *10*(3), 326-334. doi:10.1016/j.bodyim.2013.02.008

Bohlmeijer, E., Bolier, L., & Walburg, J. A. (2013). *Handboek positieve psychologie: theorie, onderzoek en toepassingen*. Uitgeverij Boom.

Bohlmeijer, E., Prenger, R., Taal, E., & Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: a meta-analysis. *Journal of psychosomatic research*, *68*(6), 539-544.

*Broderick, P. C., & Metz, S. (2009). Learning to BREATHE: a pilot trial of a mindfulness curriculum for adolescents. *Advances in School Mental Health Promotion, 2,* 35–46.

Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour research and therapy*, *44*(4), 585-599.

Case, R. (1992). The role of the frontal lobes in the regulation of cognitive development. *Brain and Cognition*, 20, 51–73.

Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of consulting and clinical psychology*, *66*(1), 7.

Chapman, P. L., & Mullis, R. L. (1999). Adolescent coping strategies and self-esteem. *Child Study Journal*.

*Clarke, A.M. and Barry, M.M. (2010), An Evaluation of the Zippy's Friends Emotional Wellbeing Programme for Primary School Children in Ireland, Health Promotion Research Centre, National University of Ireland, Galway.

Clonan, S. M., Chafouleas, S. M., McDougal, J. L., & Riley-Tillman, T. C. (2004). Positive psychology goes to school: Are we there yet? *Psychology in the Schools, 41*(1), 101-110.

Cuijpers, P., Van Straten, A., Bohlmeijer, E., Hollon, S. D., & Andersson, G. (2010). The effects of psychotherapy for adult depression are overestimated: a meta-analysis of study quality and effect size. *Psychological Medicine, 12*(2), 211.

*Cunningham, E. G., Brandon, C. M., & Frydenberg, E. (2002). Enhancing coping resources in early adolescence through a school-based program teaching optimistic thinking skills. *Anxiety, Stress, and Coping, 15*,369–381.

De Boo, G. & Wicherts, J. (2009). Assessing cognitive and behavioral coping strategies in children. *Cognitive Therapy and Research*, 33, pp. 1–20.

Donaldson, D., Prinstein, M., Danowsky, M., & Spirito, A. (2000). Patterns of children's c oping with life stress: Implications for clinicians. American Journal of Orthopsychiatry, 70, 351-359.

Dumont, M., & Provost, M. A. (1999). Resilience in adolescents: Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. *Journal of youth and adolescence*, *28*(3), 343-363.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child development*, *82*(1), 405-432.

Egeland, B., Carlson, E., & Sroufe, L. A. (1993). Resilience as process. *Development and psychopathology*, *5*(04), 517-528.

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *Bmj*, *315*(7109), 629-634.

*Firth, N., Frydenberg, E., Steeg, C., & Bond, L. (2013). Coping successfully with dyslexia: An initial study of an inclusive school-based resilience programme. *Dyslexia: An International Journal Of Research And Practice*, *19*(2), 113-130. doi:10.1002/dys.1453

Flouri, E., Tzavidis, N., & Kallis, C. (2010). Adverse life events, area socioeconomic disadvantage, and psychopathology and resilience in young children: the importance of risk factors' accumulation and protective factors' specificity. *European child & adolescent psychiatry*, *19*(6), 535-546.

Fraser, M. W., Kirby, L. D., & Smokowski, P. R. (2004). Risk and resilience in childhood. In M.W. Fraser (Ed.), Risk and resilience in childhood: An ecological perspective (2nd ed.) (pp. 1–12). Washington, DC: National Association of Social Workers.

Frost, J., & McKelvie, S. (2004). Self-esteem and body satisfaction in male and female elementary school, high school, and university students. *Sex roles*, *51*(1-2), 45-54.

Fuster, J. (1993). Frontal lobes. *Current Opinion in Neurobiology*, 3, 160–165.

Goldstein, S., & Brooks, R. B. (Eds.). (2005). *Handbook of resilience in children*. New York: Springer.

Greenberg, M. T. (2006). Promoting resilience in children and youth. *Annals of the New York Academy of Sciences*, *1094*(1), 139-150.

Hampel, P. (2007). Brief report: Coping among Austrian children and adolescents. *Journal of Adolescence*, *30*(5), 885-890.

Hampel, P. & Petermann, F. (2005). Age and gender effects of coping in children and adolescents. Journal of Youth and Adolescence, 34 (2), 73-83.

Hedges, L. V., & Vevea, J. L. (1998). Fixed-and random-effects models in meta-analysis. *Psychological methods*, *3*(4), 486.

Higgins, J. P. G. S., & Green, S. (2005). Cochrane handbook for systematic reviews of interventions 4.2. 5 [updated May 2005]. *The Cochrane Library*, (3).

Higgins, J., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in medicine*, *21*(11), 1539-1558.

Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ: British Medical Journal*, *327*(7414), 557.

Higgins, J. P. (Ed.). (2008). *Cochrane handbook for systematic reviews of interventions* (Vol. 5). Chichester: Wiley-Blackwell.

Hofferth, S. L., & Sandberg, J. F. (2001). How American children spend their time. Journal of Marriage and Family, 63(2), 295-308.

*Holen, S., Waaktaar, T., Lervåg, A., & Ystgaard, M. (2012). The effectiveness of a universal school-based programme on coping and mental health: a randomised, controlled study of Zippy's Friends. *Educational Psychology*, *32*(5), 657-677.

Hudspeth, W., & Pribram, K. (1990). Stages of brain and cognitive maturation. *Journal of Educational Psychology*, 82, 881–884.

Johnston, L. D., O'malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2010). Monitoring the Future: National Survey Results on Drug Use, 1975-2009. Volume I: Secondary School Students. NIH Publication No. 10-7584. *National Institute on Drug Abuse (NIDA)*.

*Khalsa, S. B. S., Hickey-Schultz, L., Cohen, D., Steiner, N., & Cope, S. (2012). Evaluation of the mental health benefits of yoga in a secondary school: a preliminary randomized controlled trial. *The journal of behavioral health services & research*, *39*(1), 80-90.

Kidd, S., & Shahar, G. (2008). Resilience in Homeless Youth: The Key Role of Self-Esteem. *American Journal of Orthopsychiatry*, *78*(2), 163-172.

Kirchner, T., Forns, M., Amador, Dàmaris, J. (2010). Stability and consistency of coping in adolescence: a longitudinal study. *Psicothema*, pp. 382–388.

Klinberg, T., Vaidya, C., Gabrieli, J., Moseley, M., & Hedehus, M. (1999). Myelination and organization of the frontal white matter in children: a diffusion tensor study. *NeuroReport*, 10, 2817–2821.

Lee, T., Kwong, W., Cheung, C., Ungar, M., & Cheung, M. Y. (2010). Children's resilience-related beliefs as a predictor of positive child development in the face of adversities: Implications for interventions to enhance children's quality of life. Social Indicators Research, 95, 437–453. doi: 10.1007/s11205-009-9530-x.

Lee, P. C., & Stewart, D. E. (2013). Does a Socio-Ecological School Model Promote Resilience in Primary Schools?. *Journal of School Health*, *83*(11), 795-804.

Lens, W., & Decruyenaere, M. (1991). Motivation and de-motivation in secondary education: Student characteristics. *Learning and instruction*, *1*(2), 145-159.

Lipsey, M.W. (1990). Design Sensitivity; Statistical Power for Experimental Research. Newbury Park: Sage.

*Lynch, K. B., Geller, S. R., & Schmidt, M. G. (2004). Multi-year evaluation of the effectiveness of a resilience-based prevention program for young children. *The Journal of Primary Prevention, 24,*335–353.

*Marques, S. C., Lopez, S. J., & Pais-Ribeiro, J. P. (2011). "Building Hope for the Future" – A Program to Foster Strengths in Middle-School Students. *Journal of Happiness Studies, 12,*139-152. doi:10.1007/s10902- 009-9180-3.

Marsh, H. W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of educational psychology*, *81*(3), 417.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American psychologist*, *56*(3), 227.

McCubbin, L. (2001). Challenges to the Definition of Resilience.

Miller, D. N., & Nickerson, A. B. (2007). Changing the past, present, and future: Potential applications of positive psychology in school-based psychotherapy with children and youth. Journal of Applied School Psychology, 24(1), 147-162.

*Mishara, B. L., & Ystgaard, M. (2006). Effectiveness of a mental health promotion program to improve coping skills in young children: Zippy's Friends. *Early Childhood Research Quarterly, 21*, 110–123.

Moos, R. H. (1990). Coping Responses Inventory: Youth form manual. Palo Alto, CA: Stanford University and Veterans Administration Medical Centers.

Newman, R. (2005). APA's Resilience Initiative. *Professional Psychology: Research and Practice*, *36*(3), 227.

*Noggle, J. J., Steiner, N. J., Minami, T., & Khalsa, S. B. S. (2012). Benefits of yoga for psychosocial well-being in a US high school curriculum: a preliminary randomized controlled trial. *Journal of Developmental & Behavioral Pediatrics*, *33*(3), 193-201.

Noltemeyer, A. L., & Bush, K. R. (2013). Adversity and resilience: A synthesis of international research. School Psychology International, 34(5), 474-487. doi:10.1177/0143034312472758

Norman, E. (2000). Introduction: The strengths perspective and resiliency enhancement: A nature partnership. In E. Norman (Ed.), Resiliency enhancement: Putting the strengths perspective into social work practice, (pp. 1-16). New York, NY:Columbia University Press.

*Owens, R. L., & Patterson, M. M. (2013). Positive psychological interventions for children: A comparison of gratitude and best possible selves approaches. *The Journal Of Genetic Psychology: Research And Theory On Human Development*, *174*(4), 403-428. doi:10.1080/00221325.2012.697496

Pearlin, L. I. (1989). The sociological study of stress. *Journal of health and social behavior*, 241-256.

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of health and social behavior*.

*Proctor, C., Tsukayama, E., Wood, A. M., Maltby, J., Eades, J. F., & Linley, P. A. (2011). Strengths gym: The impact of a character strengths-based intervention on the life satisfaction and well-being of adolescents. *The Journal of Positive Psychology*, *6*(5), 377-388.

*Rawana, J. S., Norwood, S. J., & Whitley, J. (2011). A mixed-method evaluation of a strength-based bullying prevention program. *Canadian Journal of School Psychology*, *26*(4), 283-300.

Rogers, A., & Pilgrim, D. (2010). *A sociology of mental health and illness*. McGraw-Hill International.

*Ruini, C., Ottolini, F., Tomba, E., Belaise, C., Albieri, E., Visani, D. et al. (2009). School intervention for promoting psychological well-being in adolescence. *Journal of Behavior Therapy and Experimental Psychiatry, 40,* 522-532.

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American journal of orthopsychiatry*, *57*(3), 316.

Seligman, M. E. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. Simon and Schuster.

Seligman, M. E., & Csikszentmihalyi, M. (2000). *Positive psychology: An introduction* (Vol. 55, No. 1, p. 5). American Psychological Association.

*Schonert-Reichl, K., & Lawlor, M. S. (2010). The effects of a mindfulness-based education program on pre- and early adolescents' well-being and social and emotional competence. *Mindfulness, 1*, 137-151.

*Shoshani, A., & Steinmetz, S. (2013). Positive psychology at school: A school-based intervention to promote adolescents' mental health and well-being. *Journal Of Happiness Studies*, doi:10.1007/s10902-013-9476-1

Spencer, S. J., Josephs, R. A., & Steele, C. M. (1993). Low self-esteem: The uphill struggle for self-integrity. In *Self-Esteem* (pp. 21-36). Springer US.

Spivak, G., & Shure, M. B. (1985). ICPS and beyond: Centripetal and centrifugal forces. American Journal of Community Psychology, 13, 226-243.

Stark, L. J., Spirito, A., Williams, C. A., & Guevremont, D. C. (1989). Common problems and coping strategies: Findings with normal adolescents. Journal of Abnormal Child Psychology, 17, 203-212.

Stuss, D. T., & Benson, D. F. The frontal lobes, 1986. *Raven, New York*.

Ter Bogt, T., Van Dorsselaer, S., & Vollebergh, W. (2003). Psychische gezondheid, risicogedrag en welbevinden van Nederlandse scholieren. *Mental health, risk behaviour and well-being of Dutch students*.

*Terjestam, Y. et al. Effects of scheduled qigong exercise on pupils' well-being, self-image, distress, and stress.*Journal of alternative and complementary medicine,* 16(9), 939-44, 2010.

Tobin, D. L., Holroyd, K. A., Reynolds, R. V., & Wigal, J. K. (1989). The hierarchical factor structure of the Coping Strategies Inventory. *Cognitive therapy and research*, *13*(4), 343-361.

*Tomba, E., Belaise, C., Ottolini, F., Ruini, C., Bravi, A., Albieri, E., et al. (2010) Differential effects of well-being promoting and anxiety-management strategies in a non-clinical school setting *Journal of Anxiety Disorders*, 24, 326–333.

Ungar, M. (2008). Resilience across cultures. British Journal of Social Work,38, 218–235. doi: 10.1093/bjsw/bcl343.

Van der Linden, M. (2012). De positieve schoolinterventie: Een meta-analyse naar de effectiviteit van schoolinterventies ter bevordering van veerkracht en welbevinden.

Watkins, D., Dong, Q., & Xia, Y. (1997). Age and gender differences in the self-esteem of Chinese children. *The Journal of social psychology*, *137*(3), 374-379.

Whitehead, A., & Whitehead, J. (1991). A general parametric approach to the meta-analysis of randomized clinical trials. *Statistics in medicine*, *10*(11), 1665-1677.

Williams, K. & McGillicuddy-De Lisi, A. (1999). Coping strategies in adolescents. *Journal of Applied Developmental Psychology*, 20 (4), pp. 537–549.

Appendix A: Search histories

PsycINFO 05.05.2014

#	Query	Limiters/ Expanders	Last Run via	Results
S14	S12 OR S13	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	316
S13	S9	Limiters - Published Date: May 2013- March 2014; Language: Dutch, English; Methodology: - Followup Study, - Longitudinal Study, - Systematic Review, - Meta Analysis, TREATMENT OUTCOME/CLINICAL TRIAL Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	50
S12	S9 AND S10	Limiters - Published Date: May 2013-March 2014 Language: Dutch, English Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	306
S11	S9 AND S10	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	5,420
S10	TI (effect* OR effic* OR outcome* OR evaluat* OR influen* OR validat* OR implement* OR interven* OR treating OR treatment* OR therap* OR theoretic*	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	2,351,364

	OR model* OR theory OR theories OR impact) OR AB (effect* OR effic* OR outcome* OR evaluat* OR influen* OR validat* OR implement* OR interven* OR treating OR treatment* OR therap* OR theoretic* OR model* OR theory OR theories OR impact) OR KW (effect* OR effic* OR outcome* OR evaluat* OR influen* OR validat* OR implement* OR interven* OR treating OR treatment* OR therap* OR theoretic* OR model* OR theory OR theories OR impact)			
S9	S4 AND S8	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	7,192
S8	S5 OR S6 OR S7	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	347,237
S7	DE “Schools”	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	21,867
S6	TI (school* OR classroom*) OR AB (school* OR classroom*) OR KW (school* OR classroom*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	331,861

S5	(DE "School Based Intervention" OR DE "School Counseling") OR (DE "Educational Programs" OR DE "After School Programs" OR DE "Educational Program Evaluation" OR DE "Educational Program Planning")	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	39,464
S4	S1 OR S2 OR S3	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	71,320
S3	DE “Goal setting”	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	2,032
S2	TI ("psychological strength" OR "strength-based approach*" OR "character strength" OR "positive emotion*" OR optimism OR positivism OR happy* OR happiness OR self-compassion OR subjective well-being OR resilience) OR AB ("psychological strength" OR "strength-based approach*" OR "character strength" OR "positive emotion*" OR optimism OR positivism OR happy* OR happiness OR self-compassion OR subjective well-being OR resilience) OR KW ("psychological strength" OR "strength-based approach*" OR "character strength" OR	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	42,599

	"positive emotion*" OR optimism OR positivism OR happy* OR happiness OR self-compassion OR subjective well-being OR resilience)			
S1	DE ("Happiness" OR "Life Satisfaction" OR "Well Being" OR "Positive Psychology" OR "Resilience (Psychological)" OR "Flow (Consciousness State)")	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - PsycINFO	40,825

ERIC 30.04.2014

#	Query	Limiters/ Expanders	Last Run via	Results
S12	S9 AND S10	Limiters - Published Date: May 2013-March 2014 Language: Dutch, English Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	12
S11	S9 AND S10	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	2,609
S10	TI (effect* OR effic* OR outcome* OR evaluat* OR influen* OR validat* OR implement* OR interven* OR treating OR treatment* OR therap* OR theoretic* OR model* OR theory OR theories OR impact) OR AB (effect* OR effic* OR outcome* OR evaluat* OR influen* OR validat* OR implement* OR interven* OR treating OR treatment* OR therap* OR theoretic* OR model* OR theory OR theories OR impact) OR KW (effect* OR effic* OR outcome* OR evaluat* OR influen* OR validat* OR implement* OR interven* OR treating OR treatment* OR therap* OR theoretic* OR model* OR theory OR theories OR impact)	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	738,627
S9	S4 AND S8	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen -	4,166

			Advanced Search Database - ERIC	
S8	S5 OR S6 OR S7	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	509,649
S7	DE “Schools”	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	1,571
S6	TI (school* OR classroom*) OR AB (school* OR classroom*) OR KW (school* OR classroom*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	503,026
S5	(DE "School Based Intervention" OR DE "School Counseling") OR (DE "Educational Programs" OR DE "After School Programs" OR DE "Educational Program Evaluation" OR DE "Educational Program Planning")	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	14,845
S4	S1 OR S2 OR S3	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	14,082
S3	DE “Goal setting”	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	18
S2	TI ("psychological	Search modes -	Interface -	7,052

	strength" OR "strength-based approach*" OR "character strength" OR "positive emotion*" OR optimism OR positivism OR happy* OR happiness OR self-compassion OR subjective well-being OR resilience) OR AB ("psychological strength" OR "strength-based approach*" OR "character strength" OR "positive emotion*" OR optimism OR positivism OR happy* OR happiness OR self-compassion OR subjective well-being OR resilience) OR KW ("psychological strength" OR "strength-based approach*" OR "character strength" OR "positive emotion*" OR optimism OR positivism OR happy* OR happiness OR self-compassion OR subjective well-being OR resilience)	Boolean/Phrase	EBSCOhost Search Screen - Advanced Search Database - ERIC	
S1	DE ("Happiness" OR "Life Satisfaction" OR "Well Being" OR "Positive Psychology" OR "Resilience (Psychological)" OR "Flow (Consciousness State)")	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - ERIC	8,010

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#	Query	Limiters/Expanders	Results
S12	Search ((((((((((("Happiness"[Title/Abstract]) OR "life satisfaction"[Title/Abstract]) OR "well being"[Title/Abstract]) OR "positive psychology"[Title/Abstract]) OR "resilience (psychological)"[Title/Abstract]) OR "flow (consciousness state)"[Title/Abstract])) OR ((((((((((("psychological strength"[Title/Abstract]) OR "strength-based approach*"[Title/Abstract]) OR "character strength"[Title/Abstract]) OR "positive emotion*"[Title/Abstract]) OR "optimism"[Title/Abstract]) OR "positivism"[Title/Abstract]) OR "happy"[Title/Abstract]) OR "happiness"[Title/Abstract]) OR "self-compassion"[Title/Abstract]) OR "subjective well-being"[Title/Abstract]) OR "resilience"[Title/Abstract])) OR "Goal setting"[Title/Abstract])) AND (((((((("School based intervention"[Title/Abstract]) OR "School counseling"[Title/Abstract]) OR "educational programs"[Title/Abstract]) OR "after school programs"[Title/Abstract]) OR "educational program evaluation"[Title/Abstract]) OR "educational program planning"[Title/Abstract])) OR (("school*"[Title/Abstract]) OR "classroom*"[Title/Abstract])) OR "schools"[Title/Abstract]))) AND ((((((((((((((("effect*"[Title/Abstract]) OR "effic*"[Title/Abstract]) OR "outcome*"[Title/Abstract]) OR "evaluat*"[Title/Abstract]) OR "influen*"[Title/Abstract]) OR "validat*"[Title/Abstract]) OR "implement*"[Title/Abstract]) OR "interven*"[Title/Abstract]) OR "treating"[Title/Abstract]) OR "treatment*"[Title/Abstract]) OR "therap*"[Title/Abstract]) OR "theoretic*"[Title/Abstract]) OR "model*"[Title/Abstract]) OR "theory"[Title/Abstract]) OR "theories"[Title/Abstract]) OR "impact"[Title/Abstract]) Filters: Publication date from 2013/05/01 to 2014/03/31	Filters: Publication date from 2013/05/01 to 2014/03/31	186

S11	Search ((((((((((("Happiness"[Title/Abstract]) OR "life satisfaction"[Title/Abstract]) OR "well being"[Title/Abstract]) OR "positive psychology"[Title/Abstract]) OR "resilience (psychological)"[Title/Abstract]) OR "flow (consciousness state)"[Title/Abstract])) OR ((((((((((("psychological strength"[Title/Abstract]) OR "strength-based approach*"[Title/Abstract]) OR "character strength"[Title/Abstract]) OR "positive emotion*"[Title/Abstract]) OR "optimism"[Title/Abstract]) OR "positivism"[Title/Abstract]) OR "happy"[Title/Abstract]) OR "happiness"[Title/Abstract]) OR "self-compassion"[Title/Abstract]) OR "subjective well-being"[Title/Abstract]) OR "resilience"[Title/Abstract])) OR "Goal setting"[Title/Abstract])) AND (((((((("School based intervention"[Title/Abstract]) OR "School counseling"[Title/Abstract]) OR "educational programs"[Title/Abstract]) OR "after school programs"[Title/Abstract]) OR "educational program evaluation"[Title/Abstract]) OR "educational program planning"[Title/Abstract])) OR (("school*"[Title/Abstract]) OR "classroom*"[Title/Abstract])) OR "schools"[Title/Abstract]))) AND ((((((((((((("effect*"[Title/Abstract]) OR "effic*"[Title/Abstract]) OR "outcome*"[Title/Abstract]) OR "evaluat*"[Title/Abstract]) OR "influen*"[Title/Abstract]) OR "validat*"[Title/Abstract]) OR "implement*"[Title/Abstract]) OR "interven*"[Title/Abstract]) OR "treating"[Title/Abstract]) OR "treatment*"[Title/Abstract]) OR "therap*"[Title/Abstract]) OR "theoretic*"[Title/Abstract]) OR "model*"[Title/Abstract]) OR "theory"[Title/Abstract]) OR "theories"[Title/Abstract]) OR "impact"[Title/Abstract])		1518
S10	Search ((((((((((((("effect*"[Title/Abstract]) OR "effic*"[Title/Abstract]) OR "outcome*"[Title/Abstract]) OR "evaluat*"[Title/Abstract]) OR "influen*"[Title/Abstract]) OR		6491403

	"validat*"[Title/Abstract]) OR "implement*"[Title/Abstract]) OR "interven*"[Title/Abstract]) OR "treating"[Title/Abstract]) OR "treatment*"[Title/Abstract]) OR "therap*"[Title/Abstract]) OR "theoretic*"[Title/Abstract]) OR "model*"[Title/Abstract]) OR "theory"[Title/Abstract]) OR "theories"[Title/Abstract]) OR "impact"[Title/Abstract]		
S9	Search ((((((((("Happiness"[Title/Abstract]) OR "life satisfaction"[Title/Abstract]) OR "well being"[Title/Abstract]) OR "positive psychology"[Title/Abstract]) OR "resilience (psychological)"[Title/Abstract]) OR "flow (consciousness state)"[Title/Abstract])) OR ((((((((((("psychological strength"[Title/Abstract]) OR "strength-based approach*"[Title/Abstract]) OR "character strength"[Title/Abstract]) OR "positive emotion*"[Title/Abstract]) OR "optimism"[Title/Abstract]) OR "positivism"[Title/Abstract]) OR "happy"[Title/Abstract]) OR "happiness"[Title/Abstract]) OR "self-compassion"[Title/Abstract]) OR "subjective well-being"[Title/Abstract]) OR "resilience"[Title/Abstract])) OR "Goal setting"[Title/Abstract])) AND (((((((("School based intervention"[Title/Abstract]) OR "School counseling"[Title/Abstract]) OR "educational programs"[Title/Abstract]) OR "after school programs"[Title/Abstract]) OR "educational program evaluation"[Title/Abstract]) OR "educational program planning"[Title/Abstract])) OR (("school*"[Title/Abstract]) OR "classroom*"[Title/Abstract])) OR "schools"[Title/Abstract])		3298
S8	Search (((((((("School based intervention"[Title/Abstract]) OR "School counseling"[Title/Abstract]) OR "educational programs"[Title/Abstract]) OR "after school programs"[Title/Abstract]) OR "educational program evaluation"[Title/Abstract]) OR "educational program planning"[Title/Abstract])) OR (("school*"[Title/Abstract]) OR "classroom*"[Title/Abstract])) OR		191491

	"schools"[Title/Abstract]		
S7	Search "schools"[Title/Abstract]		52985
S6	Search ("school*"[Title/Abstract]) OR "classroom*"[Title/Abstract]		158412
S5	Search (((((("School based intervention"[Title/Abstract]) OR "School counseling"[Title/Abstract]) OR "educational programs"[Title/Abstract]) OR "after school programs"[Title/Abstract]) OR "educational program evaluation"[Title/Abstract]) OR "educational program planning"[Title/Abstract]		5692
S4	Search (((((((("Happiness"[Title/Abstract]) OR "life satisfaction"[Title/Abstract]) OR "well being"[Title/Abstract]) OR "positive psychology"[Title/Abstract]) OR "resilience (psychological)"[Title/Abstract]) OR "flow (consciousness state)"[Title/Abstract])) OR ((((((((((("psychological strength"[Title/Abstract]) OR "strength-based approach*"[Title/Abstract]) OR "character strength"[Title/Abstract]) OR "positive emotion*"[Title/Abstract]) OR "optimism"[Title/Abstract]) OR "positivism"[Title/Abstract]) OR "happy"[Title/Abstract]) OR "happiness"[Title/Abstract]) OR "self-compassion"[Title/Abstract]) OR "subjective well-being"[Title/Abstract]) OR "resilience"[Title/Abstract])) OR "Goal setting"[Title/Abstract]		66495
S3	Search "Goal setting"[Title/Abstract]		1857
S2	Search ((((((((("psychological strength"[Title/Abstract]) OR "strength-based approach*"[Title/Abstract]) OR "character strength"[Title/Abstract]) OR "positive emotion*"[Title/Abstract]) OR "optimism"[Title/Abstract]) OR "positivism"[Title/Abstract]) OR "happy"[Title/Abstract]) OR "happiness"[Title/Abstract]) OR "self-compassion"[Title/Abstract]) OR "subjective well-being"[Title/Abstract]) OR "resilience"[Title/Abstract]		23840
S1	Search (((((("Happiness"[Title/Abstract]) OR "life satisfaction"[Title/Abstract]) OR "well being"[Title/Abstract]) OR "positive psychology"[Title/Abstract]) OR "resilience (psychological)"[Title/Abstract]) OR "flow (consciousness state)"[Title/Abstract]		46867

Appendix B: Full text assessment

Study	Inclusion	Reason for exclusion
Baum, 2013		No positive outcome measure
Beetz, 2013	x	
Bergen-Cico, 2013		No school-based intervention
Bird, 2013	x	
Botha, 2013		No school-based intervention
Cefai, 2014		book
Challen, 2014		No positive outcome measure
Cheney, 2013		Older interventions
Colley, 2013		Study protocol
Craig, 2014		Not universal
Craig, 2013		Not universal
Edwards, 2014		dissertation
Firth, 2013	x	
Gerson, 2013		No school-based intervention
Giannakos, 2013		No full text
Golan, 2014		No control group
Golan, 2013	x	
Gollub, 2014		No control group
Halliwell, 2014	x	
Jan, 2014		No control group
Jennings, 2013		Directed at teachers
Kuyken, 2013	x	
Lee, 2013	x	
Lewis, 2013		No school-based intervention

Moksnes, 2013		No school-based intervention
Morris, 2013		No positive outcome measure
Nickerson, 2013		No school-based intervention
Oberhand, 2014		dissertation
Ohl, 2013		No positive outcome measure
Olowokere, 2013		Not universal
Osgood, 2013		No positive outcome measure
Owens, 2013	x	
Petanidou, 2013		No control group
Puolakka, 2014		No school-based intervention
Quach, 2013		Study protocol
Roeser, 2013		Directed at teachers
Romero, 2014		No control group
Rooney, 2013		No positive outcome measure
Salmela-Aro, 2014		No positive outcome measure
Sarkissian, 2014		dissertation
Scoloveno, 2014		No effect study
Shoshani, 2013	x	
Slone, 2013		Not universal
Standage, 2013	x	
Stallard, 2014		Study protocol
Suldo, 2014	x	
Tahiroglu, 2013		No school-based intervention
Tipton, 2014		dissertation
Trotter, 2014		dissertation
Warne, 2013		Not universal
Zang, 2013		No full text

Appendix C: Classification of studies

Study (first author & year)	Target group (mean age)	Target group (school form)	Outcome measures	Resilience factor
Beetz, 2013	8.5	primary	self-concept	self-esteem
Bird, 2013	10-11	primary	self-esteem	self-esteem
Broderick, 2009	17.4	secondary	acceptance of the self	self-esteem
Clarke, 2010	7.3	primary	coping	coping
Cunningham, 2002	11.4	primary	coping	coping
Firth, 2013	10.6	primary	productive coping	coping
Holen, 2012	7-8	primary	coping	coping
Khalsa, 2012	16.8	secondary	resilience, self-esteem	self-esteem
Marques, 2011	10.9	secondary	self-worth scale	self-esteem
Mishara, 2006	6.2	primary	coping	coping
Noggle, 2012	17.1	secondary	resilience, self-esteem	self-esteem
Owens, 2013	7.35	primary	global self-esteem	self-esteem
Proctor, 2011	12.98	secondary	self-esteem	self-esteem
Rawana, 2011	11	primary	strengths: knowing oneself	self-esteem
Ruini, 2009	14.4	secondary	self-acceptance	self-esteem
Schonert-Reichl, 2010	11.4	secondary	self-acceptance	self-esteem
Shoshani, 2013	13.68	secondary	self-esteem	self-esteem
Terjestam, 2010	13.2	secondary	talents	self-esteem
Tomba, 2010	11.4	secondary	self-perception	self-esteem

Appendix D: CMA data

Study (first author & year)	Outcome measure	Pre/ post	Mexp	SDexp	Nexp	Mcon	SDcon	Ncon
Beetz, 2013	Self-concept	Pre	35.3	7.1	25	36.9	6.0	21
		post	34.2	9.2	25	35.4	5.9	21
Bird, 2013	Self-esteem girls	Pre	2.90	0.91	20	2.68	1.25	22
		post	3.33	1.08	20	2.86	1.35	22
	Self-esteem boys	Pre	3.57	1.20	23	3.43	1.34	23
		post	3.55	1.34	23	3.09	1.25	23
Broderick, 2009	Self-accepting	Post -pre	0.90	2.86	104	-0.65	2.98	17
Clarke, 2010	Mean number of coping strategies	Pre	17.54	4.7	523	17.6	4.7	207
		post	18.96	4.9	523	18.08	4.5	207
Cunningham, 2002	Coping efficacy	Pre	56.55	14.87	175	64.48	13.12	148
		post	63.32	14.81	163	59.97	16.36	132
	Productive coping	Pre	64.83	14.44	175	70.97	13.53	148
		post	64.68	15.07	163	64.82	14.04	132
Firth, 2013	Productive coping- nondyslexic		2.44	0.21	69	2.40	0.26	30
	Productive coping- dyslexic		2.44	0.19	19	2.33	0.22	9
Holen, 2012	Kidcope- active	pre	0.844	0.194	684	0.838	0.204	631
	emotional regulation	post	0.882	0.165	640	0.869	0.192	631
	Kidcope-	Pre	0.330	0.257	684	0.310	0.243	631
	Withdrawal	post	0.282	0.251	640	0.290	0.245	631
	Kidcope-	Pre	0.561	0.226	684	0.566	0.236	631
	Oppositional	post	0.511	0.203	640	0.552	0.211	631
Khalsa, 2012	Self-esteem	Post -pre	-0.01	5.2	70	0.60	6.6	30
	Self-confidence	Post -pre	0.11	0.6	67	-0.07	0.8	34
	resilience	Post -pre	2.08	12.8	66	-4.69	12.8	34
Marques, 2011	Self-worth	Pre	17.03	3.00	31	18.06	2.07	31
		post	19.79	2.94	31	18.06	1.98	31

Mishara, 2006	Coping strategies inventory-Denmark	Pre	70.32	31.63	322	95.29	34.94	110
		Post	71.53	30.92	322	84.80	37.52	110
	Coping strategies inventory-Lithuania	pre	71.25	36.20	314	70.73	33.65	104
		post	81.03	38.05	314	76.04	32.12	104
Noggle, 2012	Self-confidence during stress resilience	Pre	4.2	1.0	36	4.2	0.67	15
		Post	4.3	0.98	36	4.0	0.90	15
		Pre	132.9	18.4	36	132.1	12.4	15
		post	131.9	24.5	36	127.9	23.4	15
Owens, 2013	Golbal self-esteem	Pre	19.11	3.72	62	19.94	3.82	62
		post	21.50	2.85	62	20.00	4.70	62
Proctor, 2011	Self-esteem scale	Pre	3.02	0.53	218	2.94	0.49	101
		post	3.06	0.55	218	2.98	0.52	101
Rawana, 2011	Strengths: knowing oneself	Pre	45.10	7.20	50	45.90	6.32	53
		post	43.54	7.10	50	46.73	6.54	53
		Follow-up	47.54	6.21	50	47.14	5.73	53
Ruini, 2009	Self-acceptance	Pre	11.75	3.10	129	12.05	3.32	98
		post	11.88	3.90	129	12.16	3.17	98
Schonert-Reichl, 2010	Self-concept: preadolescents	Post-pre	0.010	0.27	139	-0.019	0.24	107
	Self-concept: early adolescents	Post-pre	-0.053	0.29	139	0.043	0.23	107
Shoshani, 2013	Self-esteem	Pre	31.85	5.08	537	31.41	5.10	501
		post	32.07	5.97	537	30.84	5.87	501
Terjestam, 2010	Self-image	Pre	0.82	0.51	53	0.94	0.44	66
		post	0.87	0.51	53	0.92	0.57	66
Tomba, 2010	Self-acceptance	Pre	12.95	3.26	82	12.25	3.40	80
		post	12.39	3.64	82	12.14	3.65	80

Appendix E: Study quality

Study (first author & year)	Quality criteria					
	implementation	RCT	Baseline differences	Blinding to the subjects	Drop out	Total score
Ashdown, 2012	1	1	0	0	0	2
*Beetz, 2013	0	1	0	0	0	1
*Bird, 2013	1	0	0	0	0	1
*Broderick, 2009	0	0	1	0	1	2
*Clarke, 2010	1	1	0	0	0	2
*Cunningham, 2002	1	0	0	0	1	2
deVilliers, 2012	1	1	0	0	0	2
Domitrovich, 2007	1	1	0	0	0	2
Dufour, 2011	1	0	1	0	0	2
Frey, 2005	1	1	1	0	1	4
*Firth, 2013	1	0	0	0	0	1
*Golan, 2013	1	1	0	0	0	2
Grum, 2013	0	0	0	0	0	0
Halliwell, 2014	1	0	0	0	1	2
Hennessey, 2007	0	0	1	0	0	1
*Holen, 2012	1	1	1	0	0	3
Humphrey, 2010	0	0	1	0	0	1
Huppert, 2010	0	0	1	0	0	1
*Khalsa, 2012	0	1	1	0	1	3
Kuyken, 2013	1	0	1	0	0	2
Lynch, 2004	0	0	1	0	0	1

*Marques, 2011	0	0	1	0	1	2
*Mishara, 2006	1	0	1	0	0	2
Monkeviciene, 2006	0	0	1	0	1	2
*Noggle, 2012	0	1	1	0	0	2
*Owens, 2013	0	0	1	0	1	2
*Proctor, 2011	0	0	1	0	1	2
*Rawana, 2011	0	0	0	0	1	1
Richards, 2008	0	0	0	0	0	0
Ruini, 2006	0	1	0	0	0	1
*Ruini, 2009	0	1	0	0	0	1
Schonert-Reichl, 2010	1	0	1	0	0	2
Seligman, 2009	0	1	0	0	0	1
*Shoshani, 2013	0	0	0	0	1	1
Standage, 2013	0	1	0	0	0	1
Suldo, 2013	0	1	1	0	0	2
*Terjestam, 2010	0	0	0	0	0	0
*Tomba, 2010	0	1	0	0	1	2
Witt, 2005	0	0	1	0	0	1