

# What Skills Do Addiction-Specific School-Based Life Skills Programs Promote? A Systematic Review

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**Abstract:** In school-based addiction prevention, life skills programs (LSPs) have been established since the 1990s. The scientific evidence regarding program effectiveness is in parts unclear. This review links life skills not to behavioral outcomes but to three facets of the self: the affective evaluative, the dispositional & dynamic, and the cognitive descriptive facet of the self. This complements the evidence on behavioral outcomes. In a systematic literature search we have identified drug-specific life skills programs in German language and their evaluation studies. We have mapped the instruments used to assess effectiveness of the LSP on three facets of the self, which are site of action of intrapersonal skills. We identified six comparable life skills programs that have been evaluated at least once. In five of these programs, different facets of life skills have been assessed with a total of 38 different measurement instruments. We found that improvements in affective evaluative and dispositional & dynamic facets of the self could be stimulated by LSPs, complementing previous evidence focusing on behavioral outcomes. Conclusion: Numerous instruments have been used that are not directly comparable but can be categorized by facets of the self. As a result, it is found that life skills programs can have an impact on building attitude and the shaping of intrapersonal skills. Interpersonal competencies such as communication skills and empathy have not been measured. Furthermore, a consensus on measurement instruments for life skills should be found.

**Keywords:** life skills training; life skills program; systematic review; drug-prevention; school; lions quest; IPSY; Unplugged; Rebound; Fit & Stark; ALF



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## 1. Background

The early adolescent phase is characterized by developmental tasks that follow one another in quick succession. The completion of these developmental tasks influences the entire further course of life [1]. In order to cope with these developmental tasks, adolescents may engage in behaviors that pose a risk to their health [2,3]. This includes in particular the use of legal and illegal drugs [4]. In recent years, an increase in the use of cannabis and e-cigarettes has been reported for adolescents in Germany, while the use of alcohol and tobacco has decreased slightly [5].

Drug use in early adolescence poses serious health risks for the future because the adolescent brain is very vulnerable due to maturation processes [6]. Drug use has a long-term effect on brain chemistry and promotes, for example, the development of dysfunctional coping strategies [7] and hazardous consumption behavior in adulthood [8–10].

Addiction prevention in adolescence is a high priority in public and school health promotion. In addition to societal and population based preventive measures (e.g., protection of minors, sales restrictions, taxes), behavioral approaches are used to minimize the use of psychotropic substances, to acquire risk competence, and to support young people through adolescence. Since the end of the last century, addiction prevention has focused on promoting life skills that are considered helpful for coping with developmental tasks [11]. To reach as many adolescents as possible, these behavior-oriented approaches are often embedded in the school setting.

### 1.1. Life Skills Programmes

Since the 1990s, behavioral education has increasingly focused on the life skills approach to build risk competence in dealing with legal and illegal substances [11]. The World Health Organization (WHO) has been leading the way. It defines life skills as psychosocial skills that are necessary to constructively cope with challenges that arise from dealing with the everyday world [12], and formulates ten Core Life Skills (Table 1). The WHO emphasizes the promotion of individual health through life skills and promotes the development and implementation of life skills training in various settings, including schools [12].

**Table 1.** Ten Core life skills of the WHO [12,13].

	Core Life Skill	Brief Description
1.	coping with emotions	The ability to recognize and deal appropriately with emotions and their effects [12].
2.	coping with stress	The ability to recognize sources of stress and deal with them constructively [12].
3.	creative thinking	The ability to think about alternatives and consequences of one's own actions [12].
4.	critical thinking	The ability to examine experiences and information objectively [12].
5.	decision-making	The ability to make (far-reaching) constructive decisions [12].
6.	effective communication	The ability to communicate adequately. Both verbally and nonverbally [12].
7.	empathy	The ability to imagine oneself in the situation of others, even if their situation is unfamiliar [12].
8.	interpersonal relationship skills	The ability to enter into and maintain constructive relationships. Also, the ability to end relationships [12].
9.	problem solving	The skill to find constructive solutions to complex problems [12].
10.	self-awareness	The ability to recognize oneself, one's characteristics and moods [12].

While life skills programs (LSPs) have been used in school-based addiction prevention in the USA since the 1980s [14], many life skills programs have been developed, implemented and evaluated in German-speaking countries in 1990s [15–18]. These programs are based on various models of health promotion and behavior change. Social cognitive learning theory [19], the theory of problem behavior [20] and the theory of planned behavior [21] are often used for program design. The main goals of LSPs are to provide knowledge about health risks of drug use, to promote negative attitudes toward drugs, to minimize substance use or delay initiation of use, and to strengthen other protective factors that counteract the formation of harmful behaviors. These protective factors are aspects of life skills (Table 1) that contribute, among other things, to constructive coping strategies, availability of alternative actions, self-regulatory skills, and formation of a negative attitude toward specific risky behaviors.

### 1.2. The Promotion of Life Skills Influences the Self

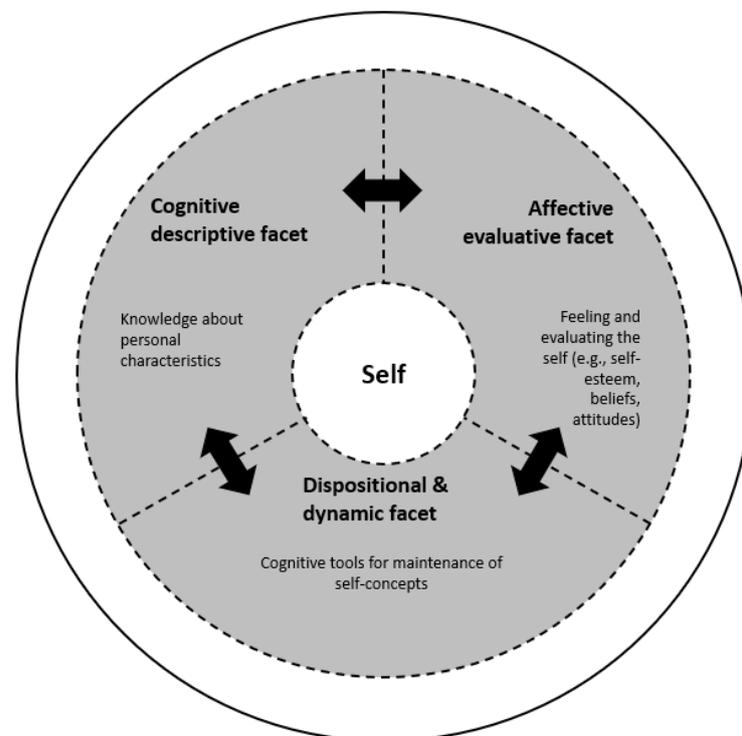
Any health promotion intervention can influence cognitive, performative, motivational, and other facets of the self at an individual level [22]. The self can be seen as the place where the promotion of life skills has its effect. This can lead to changes in the three identified facets of the self shown in Figure 1 [12,23].

The first facet of the self comprises affective evaluative facet of the self, also called self-worth. This makes up the feeling and evaluative part of the self. This can be seen, for example, in the statement: "I don't like alcohol and I'm not afraid to refuse alcohol." The Affective evaluative facet of the self contains, e.g., attitudes toward one's own person and depend, among other things, on personal values and ideas about norms [24].

The second facet addresses the dispositional & dynamic aspects of the self. These include self-regulatory abilities, self-related cognition, and dispositions of action such as self-assessment. In distinction to self-concepts and self-esteem, the dispositional & dynamic

facet of the self can be described as a set of competencies and (cognitive) tools that are applied situationally to ensure a change or stabilization of self-concepts [23,25]. This can be seen, for example, in the statement: “When I am offered alcohol, I refuse.” Access to the dispositional & dynamic aspects of the self is possible through self-reflection. This self-reflection, e.g., in the form of self-efficacy expectations, self-perception, and position in a social group, is the goal of the life skill approach, which is based on the social cognitive theory [19].

The third facet of the self comprises the cognitive descriptive aspects of the self, also called self-concepts. These self-concepts contain everything that is known or can be known about the self and can be accessed in parts through self-reflection [23]. Such knowledge could be, for example: “Alcohol helps me to engage in conversation with my friends.” This Knowledge about the self helps to cope with stressful situations. The degree of self-awareness seems to have an influence on how successfully individuals deal with personal strokes of fate [26]. If people know little about themselves, they appear to be more affected by a negative event than people who are certain about themselves.



**Figure 1.** Facets of the self, modified according to [23,27,28]. Arrows show the interaction between the facets. Dashed lines symbolize fluid boundaries between the facets. The white outer circle is intended to symbolize other possible facets of the self that have not yet been described in the review literature.

### 1.3. Efficacy of LSPs and Research Gap

For addiction prevention in particular, the effects of manualized programs on life skills promotion have been confirmed in both international and national evaluations and have been summarized in meta-analyses [29–33]. However, these meta-analyses mainly examine behavioral characteristics, such as the 30-day prevalence of tobacco use or alcohol consumption [34], which are measured with comparable or identical instruments [35–37].

The effectiveness of addiction preventive LSPs on consumption behavior is therefore well documented and discussed. However, a comparative view on the effectiveness of LSPs in promoting life skills has been missing so far. This is where this paper comes in: we present an approach to compare the effects on life skills across comparable, but different LSPs.

Based on the background presented here, we have hypothesized that (1) addiction-prevention LSPs have an impact on life skills development and (2) this development can be captured by changes in the domains of the self, we outlined above, and compared across programs. (3) In addition, we have hypothesized that domains of self and/or life skills can be identified whose promotion has not yet been evaluated.

## 2. Methods

We have conducted a systematic review according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [38] guidelines to examine the effectiveness of German-language LSPs on life skills. The following sections describe the criteria for consideration of studies for this review (Section 2.1), search methods used to identify studies (Section 2.2), data collection and analysis, assessment of risk of bias in included studies (Section 2.3), and measures of treatment effects (Section 2.4).

### 2.1. Criteria for Considering Studies for this Review

#### 2.1.1. Types of Participants

Secondary school pupils at all school types in Germany or other German-speaking countries without an addiction disorder.

#### 2.1.2. Types of Interventions

German-language addiction-specific life skills programs for secondary school I, for use in the classroom. In the case of cross-level interventions (e.g., secondary school and primary school), separate data are available for secondary school I.

#### 2.1.3. Types of Studies

Randomized controlled trials and quasi-experimental studies. If at least one measurement in one of the four domains: Behavior (use of alcohol, tobacco, or illicit drugs), Life Skills, knowledge, and attitudes toward drugs has been conducted.

#### 2.1.4. Types of Control

Control groups have implemented regular lessons or projects that did not include extracurricular health promotion elements.

#### 2.1.5. Types of Outcome Measures

As primary outcomes, we considered quantitative data on the expression of intrapersonal and interpersonal skills for this review.

Qualitative data on the expression of intrapersonal and interpersonal skills are considered as secondary outcomes.

### 2.2. Search Methods for Identification of Studies

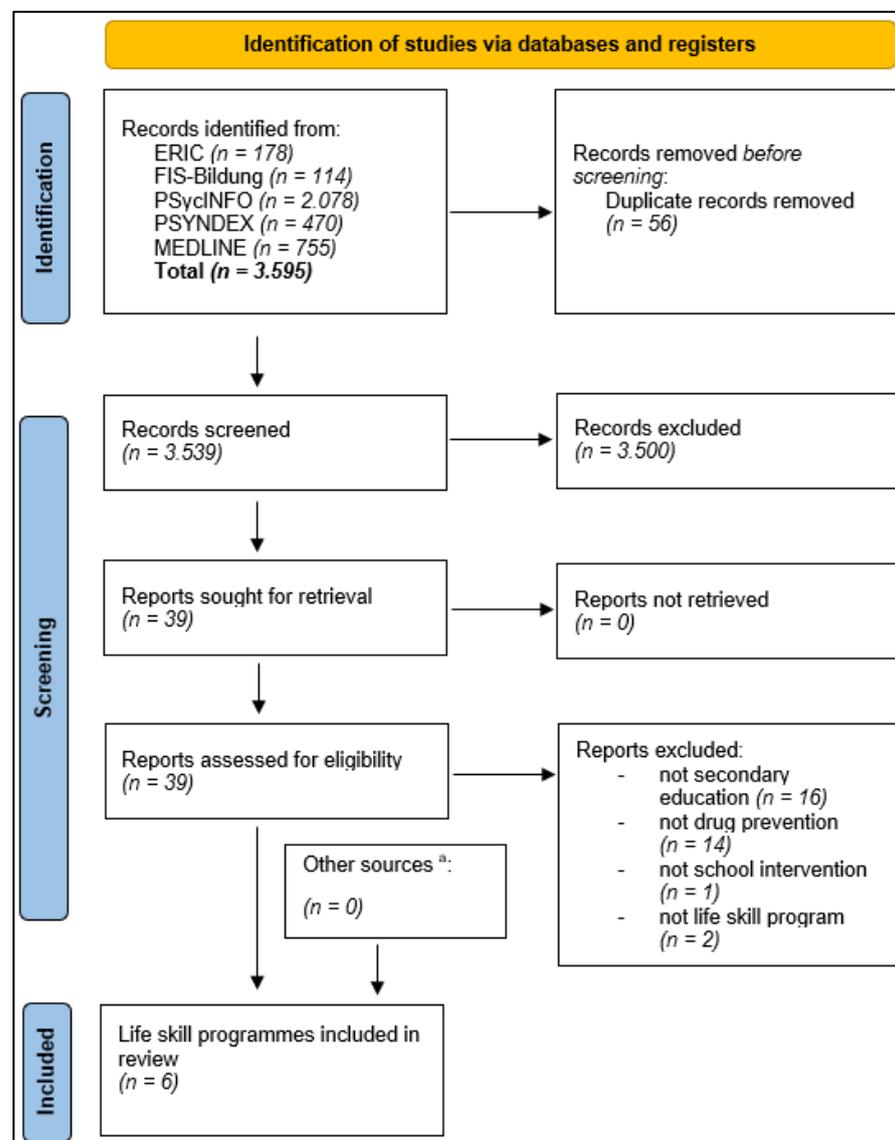
This work follows the procedure described by Khan (et al.) [39] of the conception of systematic reviews. To formulate the review question, we used the so-called PICO(S) (Population—Intervention—Control—Outcome—Study type) scheme used from evidence-based medicine [40]. Accordingly, the review question includes information on the population (P), intervention type (I), control intervention (C), outcome criteria (O), and study design (S) [41]. The narrative question is: What effects (O) of manualized, addiction-specific life skills programs in German (I) can be demonstrated for secondary school I pupils (P) in quasi-experimental or experimental (S) intervention studies with control group (C) in the domain of life skills? The year of publication did not matter.

#### 2.2.1. Electronic Searches

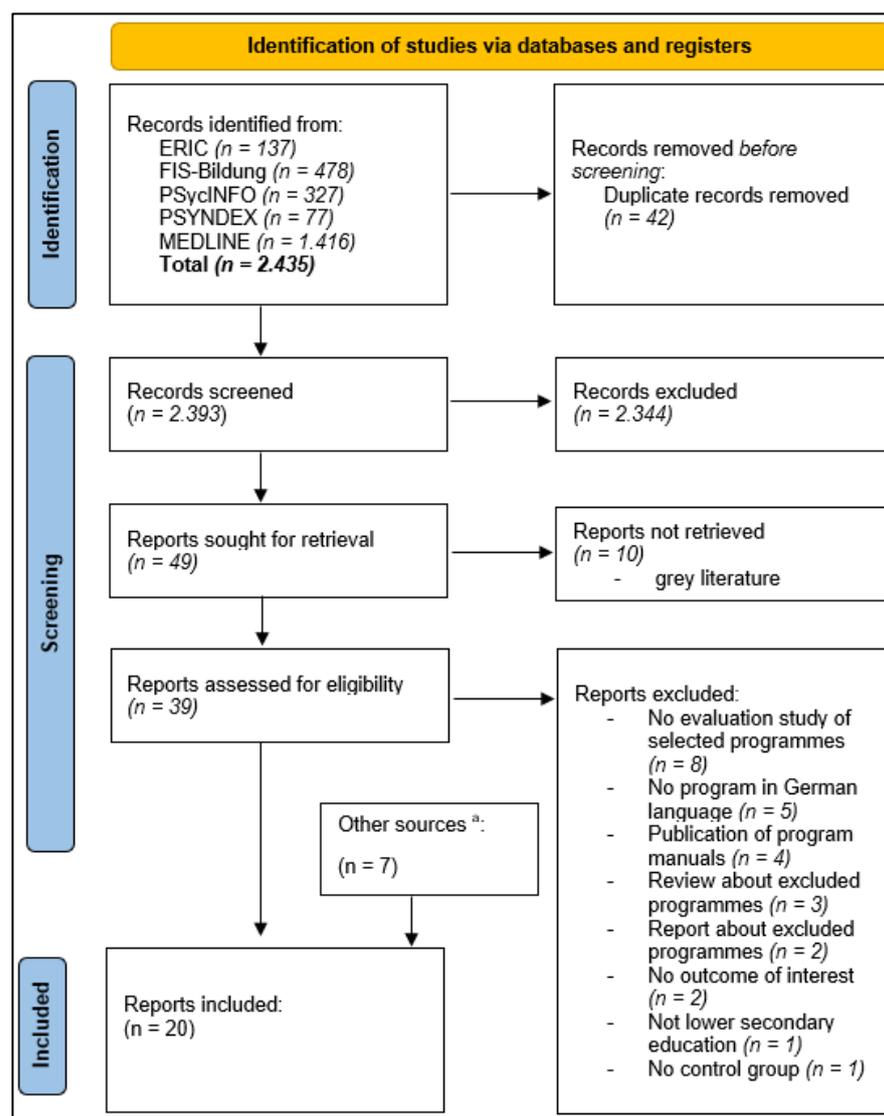
From the review question, a search strategy for a systematic electronic literature search has been developed. The search terms used in the first step to identify addiction preventive LSPs are shown in Table A1 in the Appendix A. The operator “OR” has been used within

the individual categories of the PICO scheme. In contrast, the categories have been linked with “AND”. In addition, the block “Language” has been used to allow a restriction to life skills interventions in German language. This restriction has been made to obtain a sample of LSPs that is as comparable as possible. In particular, cultural differences and different school systems could complicate the comparability of the effects of LSPs [33]. Searches have been conducted in the databases MEDLINE, ERIC, PsycINFO, PSYINDEX, and FIS-Education. Literature references in German and English language have been included. A spot search using the same search strategy with Google Scholar has not yielded any additional hits.

According to the inclusion criteria (see Section 2.1), addiction prevention LSPs have been identified in a first step (Figure 2) and evaluations of these programs in a second step (Figure 3). Both searches have been conducted from 23 January 2019 to 25 January 2019 and reviewed and updated from 21 March 2021 to 23 March 2021.



**Figure 2.** PRISMA flow diagram on included life skill programs following the search strategy shown in Table A1. <sup>a</sup> Grüne Liste Prävention, BZgA. Included programs: ALF, Fit & Stark, IPSY, Lions-Quest: erwachsen werden, Rebound, Unplugged.



**Figure 3.** PRISMA flow diagram on included evaluation reports following the search strategy shown in Table A2: ALF (four reports), Fit & Stark (two reports); IPSY (eight reports), Lions-Quest: erwachsen werden (one reports), Rebound (one reports), Unplugged (three reports); <sup>a</sup> Grüne Liste Prävention, BZgA.

In a second step, evaluation studies on the previously selected LSPs have been conducted in the above-mentioned electronic databases. The advanced search strategy is shown in Table A2 in the Appendix A.

### 2.2.2. Searching Other Resources

The references of relevant systematic reviews and included studies have been searched by hand for relevant citations. In addition, the directories of health-related institutions (grüne Liste Prävention, BZgA) and the publishers of the programs have been reviewed for relevant citations. The inclusion criteria described in Section 2.1. have been considered.

## 2.3. Data Collection and Analysis

### 2.3.1. Selection of Life Interventions for Addiction Prevention

T.L. and U.Spö. identified German-language manualized programs for school-based substance abuse prevention independently; there was one hundred percent consistency.

### 2.3.2. Selection of Studies

First, titles and abstracts of all entries found by T.L. and U.Spö. have been independently checked for inclusion. Then, the full text reports of the included entries have been obtained. These full-text reports have been reviewed for inclusion in a second step by the same reviewers. In the case of inconclusive data, consensus was reached through discussion.

### 2.3.3. Data Extraction

For data extraction, a template has been created and applied to each study. It contains information about the data collection method, the study participants, the intervention, and the outcomes collected (Tables A5–A14 in the Appendix C).

### 2.4. Assessment of Risk of Bias in Included Studies

The risk of bias assessment for each study has been performed using the Risk Of Bias In Non-randomized Studies—of Interventions tool (ROBINS-I tool) [42], which is also recommended by the Campbell Collaboration [43]. This tool enables the assessment of the risk of bias of non-randomized studies in seven areas shown in Table 2. This selection has been made due to non-individual randomization in cluster-randomized trials and the inclusion of quasi-experimental studies.

**Table 2.** Risk of bias summary: review authors' judgements about each risk of bias according to the ROBINS-I-Tool for each included study.

Study	Measurement	Missing Data	Deviation from Intervention Plan	Classification of Interventions	Selection	Confounding	Selective Reporting
ALF 1 [35,44]	L	M	L	L	L	L	L
ALF 2 [45,46]	M	L	L	L	L	L	L
Rebound [47]	M	H	L	L	L	L	L
Unplugged [48–51]	M	L	U	L	L	L	L
L-Q [52]	M	L	L	L	L	L	L
F&S 1 [53]	M	L	L	L	L	L	L
F&S 2 [37]	M	H	H	M	L	L	L
IPSY 1 [36,54–58]	M	L	L	L	L	L	L
IPSY 2 [59]	M	L	L	L	L	L	L
IPSY 3 [60]	M	L	L	L	L	L	L

L-Q Lions Quest: erwachsen werden, F&S Fit und Stark. **H** high, **M** moderate, **L** low, **U** unclear. Risks have been indicated for the evaluation studies, since the individual reports on an evaluation do not differ.

### 2.5. Measures of Treatment Effect

A direct comparison of evaluation studies requires comparable outcomes measurement. In the evaluation studies, instruments for the evaluation of interpersonal (e.g., empathy, interpersonal relationship skills and communication skills) and intrapersonal skills have been specifically sought. The instruments used to measure intrapersonal skills (self-awareness, coping with stress, coping with emotions, problem solving, decision making, creative thinking & critical thinking) are very diverse and cover only a few aspects of the respective skills, so that they could not be assigned to individual life skills. Therefore, a quantitative aggregation in the form of a meta-analysis is not possible. Nevertheless, to establish a qualitative comparability, we have created an assignment of the measurement instruments to three facets of the self described above (Figure 1). This has been done in a consensual discourse, whereby three persons (TL, LP & TS) first had made an independent assessment before finding consensus in a discussion (Tables A15–A17).

### 3. Results

#### 3.1. Results of the Search

In the first step of the systematic search, 39 German-language LSPs have been identified (Table A3). In accordance with the inclusion criteria, six comparable LSPs have been selected based on their target group and addiction prevention objectives: ALF, Fit & Stark fürs Leben Klassen 5 und 6 (F&S) (Fit & strong for life, grades 5 and 6), Lions-Quest: erwachsen werden (L-Q) (growing up. English name of program is: Lions-Quest: skills for adolescence), Rebound, Unplugged and IPSY. The second step was to search for evaluation studies on the six included addiction prevention LSPs. Thereby, 2435 citations (Figure 2) have been found. After automatic removal of 42 duplicates, the titles and abstracts of the remaining 2393 hits have been screened for potential eligibility. The large number of citations seems surprising. The reason is that rebound also is a medical term that has led to a high number of irrelevant citations. Finally, a full text screening of 39 hits resulted in a sample of 20 reports on 10 evaluation studies.

#### 3.2. Description of the Selected School-Based LSPs

All six programs refer to the life skills approach of the WHO, have been manualized and implemented in the secondary school classroom [12]. The key theoretical foundation is Bandura's social cognitive theory. For four programs, the theory of problem behavior has also been mentioned (ALF, Unplugged, L-Q and F&S) [61–64]. The theory of planned behavior is referred to in two programs (ALF and L-Q) [62,63].

In terms of content, the programs are similar. The following topics could be identified based on the title of the lessons in all six programs: (1) me and the group and peer pressure, (2) coping with feelings and stress, (3) communication and relationship skills, (4) resilience and critical thinking in combination with knowledge about drugs, and (5) problem solving. Topic (6), self-confidence and self-esteem, is present in all programs except F&S.

In terms of intervention duration and planned modular implementation, the programs differ. All programs except L-Q have a linear structure. This means that individual lessons are carried out in a predefined sequence. Of these, Unplugged has the shortest and Rebound the longest intervention duration (Table 3). The length of each lesson also varies. While the ALF, IPSY, Rebound, and Unplugged programs provide 90-min units, F&S and L-Q provide 45-min units. All programs include homework assignments that can extend the engagement time with the content.

**Table 3.** An overview of the included LSPs' main characteristics.

	Publisher	Year <sup>a</sup>	Program Target	Target Group	Time in Minutes	TTT <sup>b</sup>
ALF	[63]	2000	Alcohol and tobacco prevention	Lower secondary education	12 × 90 = 1080	Optional/2 days
F&S	[65]	2005	Addiction prevention	5th & 6th grade	21 × 45 = 945	none
IPSY	[66]	2014	Alcohol and tobacco prevention	10–15 years old	10 × 90 = 900 & 5 × 45 <sup>c</sup> = 225	optional/1 day
L-Q	[62]	2000	Addiction prevention	10–15 years old	70 × 45 <sup>d</sup> = 3150	Mandatory/3 days
Rebound	[67]	2014	Addiction prevention	Secondary education	16 × 90 = 1440	optional
Unplugged	[61]	2009	Addiction prevention	12–14 years old	12 × 50 = 600	optional/3 days

<sup>a</sup> Latest version of program-manual; <sup>b</sup> train the trainer seminar; <sup>c</sup> with booster sessions in 6th grade; <sup>d</sup> the life skills program L-Q consists of seven topics with assigned materials. Those can be integrated into regular lessons.

L-Q occupies a special position in terms of time and content. This intervention has a dynamic structure that allows a larger selection of a total of 70 individual 45-min lessons on the previously mentioned topics. The choice gives the trainer the possibility to adapt

the content of the intervention to the needs of the target group. In the evaluation study of L-Q, a weekly lesson from one of the two topics “me and my new group” or “strengthening self-confidence” has been planned.

The Rebound program is the only LSP that integrates peer teaching into the life skills approach. Mentors act as role models for different life paths [67]. These mentors are present in some lessons and share their experiences with the pupils.

F&S and Unplugged are distinct from the other LSPs in their recurring lesson structure. In F&S, there is always an introduction, a relaxation exercise, a main topic, and a homework assignment. A typical Unplugged unit consists of an introduction, a main activity, and a conclusion.

The ALF and IPSY programs are largely identical, as described above. For example, both programs cover topics such as communication, information on tobacco and alcohol, dealing with advertising and the media, feelings and self-image. A unique feature of ALF is the use of teaching elements for self-regulation in each individual teaching unit.

For all programs except F&S, train-the-trainer seminars, or advanced trainings between one and three days are offered. Participation is mandatory for the L-Q program and optional for ALF, IPSY, Rebound, and Unplugged (Table 3).

### 3.3. Included Studies and Their Implementation

According to [39], the individual evaluation studies are examined from different perspectives. There are differences in the study design, the number of study participants, the measurement time points, the instruments used and the type of implementation (Table 4). Cluster-randomized studies with class-wise ( $n = 5$ ) and school-wise ( $n = 3$ ) assignment to intervention and control groups and two quasi-experiments have been included (Table 4).

**Table 4.** Compilation of selected studies, their design, and other general aspects.

Randomization by Classes										
Studies	Year <sup>a</sup>	<i>n</i>	Control <sup>b</sup>	Follow Up in Months <sup>c</sup>					Instruments Applied <sup>d</sup>	Compliance in Percent <sup>e</sup>
				T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>		
ALF 2 [45,46]	-	753	R	12	12	-	-	-	12	84% (907)
Rebound [47]	2011	1125	R	10	-	-	-	-	15	100% (1440)
L-Q [52]	2000	974	R	9	6	-	-	-	7	75% <sup>f</sup> (540)/62% <sup>g</sup> (446)
F&S 1 [53]	1998	1858	R	15	-	-	-	-	8	78% (738)
IPSY 2 [59]	-	105	S	10	24	-	-	-	9	66% (900)
Randomization by schools										
Studies	Year <sup>a</sup>	<i>n</i>	Control <sup>b</sup>	Follow up in months <sup>c</sup>					Instruments applied <sup>d</sup>	Compliance in percent <sup>e</sup>
				T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>		
Unplugged [48–51]	2004	7079	R	6	18	-	-	-	2	not specified
F&S 2 <sup>h</sup> [37]	-	1370	R	10	6	-	-	-	5	at least 60%
IPSY 1 [36,54–58]	2003	1692	R	6	12	12	12	12	21	80% (1080)
Quasi-experimental design										
Studies	Year <sup>a</sup>	<i>n</i>	Control <sup>b</sup>	Follow up in months <sup>c</sup>					Applied Instruments <sup>d</sup>	Compliance in percent <sup>e</sup>
				T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>		
ALF 1 [35,44]	1995	675	R	8	12	12	-	-	20	100% (1080)
IPSY 3 [60]	-	1131	R	6	12	-	-	-	13	80% (1080)

L-Q Lions-Quest: erwachsen werden, F&S Fit und Stark. *n* = study participants; pre-test (*t*<sub>0</sub>) for all evaluations immediately before start of intervention not shown here; <sup>a</sup> Start of intervention; <sup>b</sup> R = regular school curriculum, S = school newspaper project; <sup>c</sup> months after last measurement; <sup>d</sup> total number of used measures; <sup>e</sup> calculated from the average program implementation in the study and the total duration of the program; <sup>f</sup> 5th grade; <sup>g</sup> 7th grade; <sup>h</sup> booster sessions in 6th grade included. <sup>h</sup> implemented both F&S and L-Q. Proportions are not specified.

Evaluations vary in number and interval of measurement points (Table 4). The interval between pre- and posttests ( $t_0$ – $t_1$ ) ranges from six [36,50] to 15 [53] months and the intervals of follow-up measurements varies from six months to four years [36,37,52]. In two cases, only one pre-test and one post-test have been performed [47,50]. A total of 69 different measurement instruments for the domains of behavior, knowledge, and life skills have been used in the evaluations. Their use in the individual program evaluations is presented in Section 3.6.

All interventions have been carried out in regular secondary school lessons (ALF, F&S: grade 5&6; L-Q: grades 5&7; Rebound & Unplugged: entire secondary school). Here, weekly teaching is presented as the norm. An exception is described for the IPSY program, which has been applied as a block course in an evaluation [59]. As a special feature, a three-tier design with a control group and two intervention groups is described for this intervention, which provides program delivery by teachers and by peers. For the programs ALF and IPSY, booster sessions are conducted in the 6th grade (ALF & IPSY) and in the 7th grade (IPSY), respectively. Apart from the block course, four months has been reported as the shortest implementation period for the F&S program [64]. The programs Rebound and Unplugged have been taught in periods of five months [47,50]. For the remaining evaluations, the intervention period has been described as nine months or full school year. For the ALF, F&S, IPSY, Rebound, and Unplugged intervention studies, full program content has been implemented. In the evaluation of L-Q, out of 70 possible units of the L-Q program, 16 from the topic areas “I and my (new) group” and “Strengthening self-confidence” are implemented for the evaluation study [52].

High program compliance has been reported for nine evaluation studies (Table 4). In one evaluation of ALF [44] and the evaluation of Rebound [47], the contents have been fully implemented. In the other evaluations of IPSY, 80% [36,54–58,60] and 66% [59] content implementation has been reported. In the second evaluation of ALF [45,46], 84% have been implemented. In the evaluation of L-Q [52], 75% have been applied in 5th grades, 62% in 7th grades, and 78% [53] and over 60% [37] in F&S and L-Q, respectively. The corresponding duration of program application is shown in Table 4. No data are available on the program implementation of Unplugged.

### 3.4. Setting and Study Participants

The evaluation studies differ in particular regarding the regional location of the schools, the respective types of school, and the age and gender of the participants (Table 5). All studies except for one evaluation of the program F&S [53] (Schools in Austria, Denmark, Germany, and Luxembourg) and the evaluation of Unplugged [48–51] (Schools in seven European countries: Austria, Belgium, Germany, Greece, Italy, Spain, and Sweden) have been implemented in Germany. Whereby the locations could not always be localized precisely. Both evaluations of the program ALF and the evaluation of L-Q have been conducted in the urban area [35,45,52]. The studies of the IPSY program have focused on the state of Thuringia (a more precise specification is missing) [56], an evaluation of Rebound had taken place in southern Germany [47] and an evaluation of the programs F&S and L-Q in northern Germany [37]. Two studies examine schools in several countries [50,53].

The evaluation studies have been conducted at different school types (Table 5). The studies on IPSY and one study on ALF include secondary and regular schools [45,52,56]. One study includes grammar schools [56] and two studies have recruited lower secondary school pupils [44] and pupils of low socioeconomic status [37], respectively. Three evaluations have been designed across school types, although it is not clear to what extent individual school types are included [47,50,53].

**Table 5.** Characteristics of study participants and setting.

Study	Age (M)	Gender (♀)	Setting
ALF 1 [35,44]	10.4	45.5%	Secondary schools, Munich (Bavaria)
ALF 2 [45,46]	10.8	49.8%	Secondary schools, Gütersloh (NRW)
Rebound [47]	14.8	51.9%	9th & 10th grades, southern Germany
Unplugged [48–51]	13.2	49%	Schools in 7 European countries
L-Q [52]	10.4/13.0 <sup>a</sup>	49%/45%	5th & 7th grades in Lübbecke (NRW)
F&S 1 [53]	11.49	48.1%	Schools in Germany, Austria, Denmark & Luxembourg
F&S 2 [37]	not specified	47.1%	not specified
IPSY 1 [36,54–58]	10.47	52.9%	Grammar & secondary schools, Thuringia
IPSY 2 [59]	10.74	43.8%	Grammar & secondary schools, Thuringia
IPSY 3 [60]	10.45	53.5%	Grammar & secondary schools, Thuringia

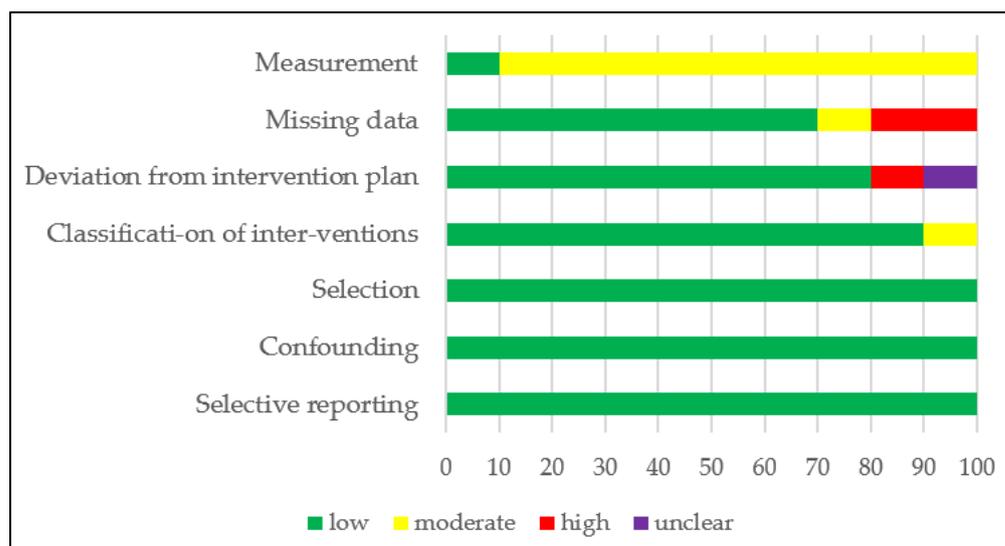
L-Q Lions-Quest: erwachsen werden, F&S Fit und Stark. <sup>a</sup> Age of 7th grade population.

The study participants differed in age (Table 5). According to the implementation of the programs ALF, L-Q, and IPSY at the beginning of lower secondary school (5th & 6th grade), the pupils are between ten and eleven years old, or 11.59 years old on average in the case of F&S. In contrast, the Unplugged and Rebound programs target all grades of lower secondary school. The age of study participants is reported to be just under 13 years for Unplugged and 14.8 years on average for Rebound [47,50].

The gender profile in the evaluation studies is not always well-balanced. In two evaluations of IPSY [36,60] and the evaluation of Rebound [47] the proportion of girls is over 50%. In the other evaluations, the proportion of girls is lower than 50%, in one case even only 43.8% (IPSY, [59]).

### 3.5. Risk of Bias in Included Studies

An assessment of the quality of the evaluations by the ROBINS-I-tool shows a good study quality overall (Table 2, Figure 4). In detail, seven potential domains of bias have been analyzed, whereby risks could be identified in four domains.



**Figure 4.** Authors' judgements about each risk of bias according to the ROBINS-I-Tool presented as percentages across all included studies.

### 3.5.1. Measurement

The first domain to be mentioned is measurement bias. This risk is very prominent. Since all reports are based on self-reporting by the pupils, there is a general risk of bias, whereby over- or underestimation is possible in principle. Due to the number of studies, it is difficult to give a tendency. Only in one study an attempt has been made to minimize the measurement bias by influencing the response of the pupils by a carbon monoxide measurement used in the evaluation [35,44]. The aim is to ensure that the pupils answered the questions about their tobacco consumption to the best of their knowledge and belief.

### 3.5.2. Missing Data

The second risk of bias is in the domain of missing data. In one case, the comparability of the intervention and control groups has been affected by drop-out [47]. Here, differences between the drop-out and holding samples have been reported in terms of the expression of alcohol and cannabis use, behavioral problems, and knowledge about drugs. Furthermore, systematic drop-out has been assumed, since especially pupils with a higher consumption experience dropped out of the troll group. In another study, the drop-out sample has not been explained with overall low drop-out (23%) [37]. In the third case, there has been a moderate risk of bias [35,44]. There, the dropout of pupils has been explained by class and school changes. Older pupils and boys have been more likely to drop out of the study. Also, school changes to grammar school have occurred more frequently in control classes. Nevertheless, it has been reported that the dropout sample did not differ from the hold sample in terms of consumption behavior [35].

### 3.5.3. Deviation from Intervention Plan and Bias in Classification of Interventions

The third risk of bias arises from deviations from the intervention plan. There is a risk that program effects are underestimated if the implementation of the programs is inadequate, e.g., if less content of the LSPs has been taught than was planned in the intervention plan. Such a risk has been identified in two cases. In the first case, in the evaluation of the program Unplugged, the intervention plan has been described in concrete terms [50]. But the implementation has not been reported, so the risk cannot be assessed. In the second case, the intervention plan has been deviated from in such a way that a reassignment of intervention and control classes has subsequently been made. In this assignment, intervention classes with lower program implementation have been evaluated as control classes [37]. This subsequent reassignment of actual intervention classes may result in an overestimation of program effects. It also increases bias due to incorrect assignment, which has been identified as a fourth risk. This study was included because it reported results with both reassigned groups and the original allocation [37].

Risks for selection bias, confounding, and selective reporting have not been found.

## 3.6. Summary of the Evidence

Due to the heterogeneity of the measurement instruments used, the intervention effects are reported here in narrative form. A total of 69 different instruments has been used. Of these, 38 have been used to measure aspects of life skills, twelve to measure consumption behavior, fifteen to measure knowledge, and four to measure three other areas: school bonding, class climate (2×), and alcohol-related problems. The outcome categories in the domains of knowledge and behavior are relatively easy to formulate; they include knowledge about life skills, knowledge about drugs, and consumption behavior. However, the results in these categories have been reported in reviews elsewhere [16,30] and are not presented here. In addition, no life skills instrument was used in the evaluation of the Unplugged program, so it has not been considered further.

### 3.6.1. Which Life Skills Are Evaluated?

The instruments used in the studies are related to life skills (Table 1). The comparison has shown that the interpersonal life skills, interpersonal relationship skills, communication and empathy are not evaluated in any case. Applied instruments associated with the intrapersonal life skills have been assigned to the three facets of the self, the affective evaluative, the dispositional & dynamic, and the cognitive descriptive facet (Figure 1). The studies included show that these facets of the self have been investigated with varying intensity. This concerns both the quantity and the quality in terms of the validity of the instruments. The affective evaluative and dispositional & dynamic facet of the self have been investigated in particular. Hence, for the measurement of the affective evaluative facet of the self, eight empirically validated and fourteen newly designed instruments have been used (Table A15). For the dispositional & dynamic facet of the self, ten of fifteen instruments have been previously empirically validated (Table A16). For the cognitive descriptive facet, a single validated instrument has been used (Table A17). An overview of all instruments used for facets of the self can be found in Appendix D (Tables A15–A17). A detailed presentation of the individual measurement results is given in Tables 6–8.

Changes in the affective evaluative facet of the self have been assessed with a total of 22 different instruments, with 19 being used in only one study at a time (Table A15). Two scales on self-concepts (general self-worth & appreciation through others) have been applied in two studies on IPSY [56,60]. Another scale, Expectation regular use: tobacco, has also been applied in two studies on IPSY [36,59]. From the measures of the affective evaluative facet of the self, seven significant results are obtained in the scales Proneness to illicit drug use: Cannabis & Ecstasy (IPSY), the Expectation regular use: tobacco (IPSY, 2x), Willingness to quit smoking (L-Q), Self-esteem (L-Q), and risk perception personal and relative (Rebound, Table 6).

Changes in the dispositional & dynamic facet of the self have been assessed with fifteen different instruments in 21 individual measurements (Table A16). The three scales Self-concept of stability against groups, Self-concept of problem solving skills, and Resistance to peer pressure have been used in two evaluations of the program IPSY [54,56]. Three other scales have been used in evaluations of different LSPs: a Social skills scale used in evaluations of the programs F&S and L-Q [37,52], a self-assessment of Life skills resources scale in ALF and IPSY [45,54], and a self-assessment of Life skills deficits scale, also in ALF and IPSY [45,54]. Significant differences have been reported in the scales Life Skills Resources (ALF), Resistance to Peer Pressure (IPSY, 2x), Resistance cigarette (IPSY), and Social competence 2 (L-Q) (Table 7).

Changes in the cognitive descriptive facet of the self have been tested with an instrument measuring social support in an evaluation of ALF [44]. No significant difference was found between intervention and control classes (Table 8).

**Table 6.** Application and effects of instruments in the affective evaluative facet of the self.

Instruments	Evaluations	Self: Affective & Evaluative Facet																									
		ALF		ALF		F		F		IPSY					IPSY		IPSY		L-Q		R						
		[44]	[35]	[46]	[45]	[53]	[37]	[56]	[54,58]	[36,55]	[59]	[60]	[52]	[47]	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	
Attitude towards alcohol	•	•																									
Attitude towards cannabis	•	•																									
Attitudes towards smoking 1							•																				
Attitude towards smoking 2	•	•																									
<b>Expectation regular use: alcohol</b>										•	•	•	•														
<b>Expectation regular use: tobacco</b>										+							+	+									
<b>Expected consequence: alcohol</b>	•	•																									
Expected consequence: drugs	•	•																									
Expected consequence: smoking	•	•																									
Perceived positive consequences of smoking							•																				
Proneness to illicit drug use: Cannabis & Ecstasy											++	++	++	++	++												
Readiness to try smoking																							•	•			
Resistance certainty to refuse a cigarette offer																						•	•				
Risk perception general																											+
Risk perception personal																											+
Risk perception relative																											•
<b>Self-concept of appreciation through others</b>										•	•	•	•									•	•				
<b>Self-concept of general self-worth</b>										•	•	•	•									•	•				
<b>Self-esteem 1</b>	•	•																									
<b>Self-esteem 2</b>																							• <sup>a</sup>	+ <sup>a</sup>			
<b>Susceptibility to smoking</b>							•																				
<b>Willingness to quit smoking</b>																							• <sup>a</sup>	+ <sup>a</sup>			

F Fit & Stark, L-Q Lions-Quest: erwachsen warden; R Rebound; • no difference between intervention and control; + low effect and ++ moderate effect in advantage of intervention; grey no measure performed; bold validated instruments; follow up intervals in months shown in Table 4. <sup>a</sup> Girls.

**Table 7.** Application and effects of instruments in the dispositional & dynamic facet of the self.

		Self: Dispositional & Dynamic Facet																					
Instruments	Evaluations	ALF			ALF		F		F		IPSY					IPSY		IPSY		L-Q		R	
		[44]	[35]	[46]	[45]	[53]	[37]	[56]	[54,58]	[36,55]	[59]	[60]	[52]	[47]	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	
		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>
Helplessness		•	•																				
Life Skills Deficits				•	•					•	•	•	•										
Life Skills Resources				+	+					•	•	•	•										
Resistance alcohol															•	•							
Resistance cigarette															+	+							
Resistance to Peer Pressure										+	•	•						+	+				
Resisting Peer Pressure		•	•																				
Self-concept of problem solving skills											•	•	•	•				•	•				
Self-concept of stability against groups											•	•	•	•				•	•				
Self-efficacy 1		•	•																				
Self-Efficacy 2								•	•														
Social competence 1		•	•																				
Social competence 2						•															++ <sup>a</sup>	++ <sup>b</sup>	
Social competence 3								•	•														
Tobacco consumption intention										•													

F Fit & Stark, L-Q Lions-Quest: erwachsen werden, R Rebound; • no difference between intervention and control; + low effect and ++ moderate effect in advantage of intervention; grey no measure performed; bold validated instruments; follow up intervals in months shown in Table 4; <sup>a</sup> low effect in 5th grade girls and moderate effect in 7th grade girls; <sup>b</sup> moderate effects in both 5th and 7th grade girls.

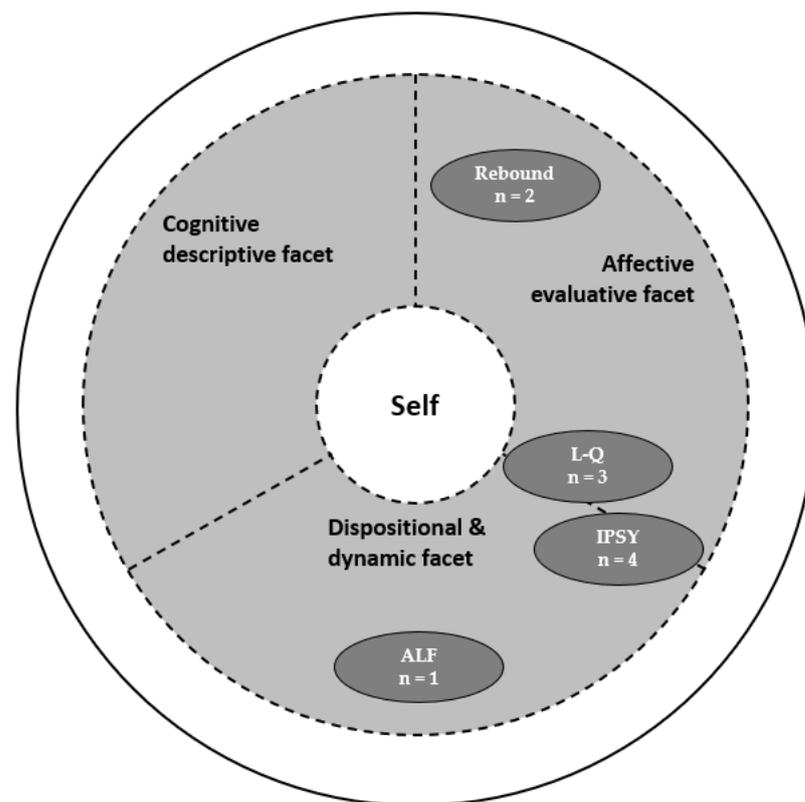
**Table 8.** Application and effects of instruments in the cognitive & descriptive facet of the self.

		Self: Cognitive & Descriptive Facet																						
Instruments	Evaluations	ALF			ALF		F		F		IPSY					IPSY		IPSY		L-Q		R		
		[44]	[35]	[46]	[45]	[53]	[37]	[56]	[54,58]	[36,55]	[59]	[60]	[52]	[47]	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>							
		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>1</sub>	T <sub>2</sub>								
Social support		•	•																					

F Fit & Stark, L-Q Lions-Quest: erwachsen werden, R Rebound; • no difference between intervention and control; grey no measure performed; bold validated instruments; follow up intervals in months shown in Table 4.

### 3.6.2. Effects in the Individual Evaluations

The significant program effects found in the area of the self are concentrated on the affective evaluative facet and dispositional & dynamic facet of the self (Figure 5). These effects are found in four of the six programs: ALF, IPSY, L-Q, and Rebound. Small and medium effect sizes are reported. Medium effects in the affective evaluative facet of the self are found for Proneness to illicit drug use: cannabis & ecstasy (“How do you relate to... (cannabis, ecstasy)?”, IPSY [36]), General (Subgroup: non-consumers) and Personal risk perception (“how risky is it (a drug) for me/everybody? “, Rebound [47]), and Resistance to an offer of a cigarette (“How easy or difficult is it for you to say no when someone offers you a cigarette and you don’t want to smoke?”, L-Q [52]). The Expectation regular use: tobacco (IPSY [56]) slightly misses a medium effect size. The scales Willingness to quit smoking (L-Q, girls [52]) and Self-esteem in girls (L-Q [52]) measure small significant effects, both not at the post-test but at the follow-up survey.



**Figure 5.** Effects of programs in facets of the self according to proven effectiveness. Naming of the scales that became significant per program: ALF Life Skills Resources; IPSY Expectation regular use: tobacco, Resistance to Peer Pressure, Proneness to illicit drug use: Cannabis & Ecstasy, Resistance cigarette; L-Q Self-esteem 2, social competence, Willingness to quit smoking; Rebound Risk perception general, risk perception personal.

In the category of the dispositional & dynamic facet of the self, 5th and 7th graders are assessed with medium effect sizes by an instrument on social competence (“How easy or difficult is it for you to do the following things....: say “no” when someone asks you to do something you don’t want to do?”, L-Q [52]). These have developed differently by the end of the observation period (six months later). For the fifth graders, the program effect, which have been still small at post-test, increased further between post-test and follow-up, while it decreased slightly for the seventh graders [52]. This instrument has also been used in an evaluation of the F&S program, where no differences are found between intervention and control classes. Other small effects, sorted by effect size, are found in Resistance to cigarettes (IPSY [59]), Life skills resources (ALF [45]), and Resistance to peer

pressure (IPSY [56]). The Life skills resources measurement tool has also been used in an evaluation of the program IPSY, where it could not detect differences between intervention and control classes [54].

In addition, single significant results that are not easily categorizable have been reported. Measurement instruments on school bonding in an evaluation of the program IPSY [56], classroom climate in an evaluation of the F&S program [53], and a survey of problems caused by alcohol (such as accidents, damage to clothes, fights...) in an evaluation of Unplugged [50] have shown differences between intervention and control classes.

### 3.6.3. Effects of Individual LSPs

The six LSPs have been studied with varying degrees of intensity. There are differences in the number of instruments used, but also in the observation period of the evaluations. The most thoroughly studied programs are ALF and IPSY. Fourteen different instruments have been used to measure life skills in ALF and thirteen in IPSY. In addition, in IPSY, up to 48 months (t5) of follow-up have been examined in individual cases. Six instruments have been used for F&S, five for L-Q, and three for Rebound.

Looking at the proven quality of the measurement instruments as well as the results of the individual measurements, the overview shown in Table 9 results.

**Table 9.** Significant effects of individual LSPs. Compilation of the number of previously validated and newly designed instruments for evaluating the promotion of life skills.

LSPs	Instr. Used	Number of Validated Instruments/New Designed Instruments	
		Name of Validated Instrument/Name of New Designed Instrument	Significant Results
ALF	9/5	• Life Skills Resources	—
F&S	2/4	—	—
IPSY	9/4	• Expectation regular use: tobacco *, • Resistance to Peer Pressure *	• Proneness to illicit drug use: cannabis & ecstasy • Resistance cigarette
L-Q	1/4	• Self-esteem 2	• social competence • Willingness to quit smoking
Rebound	0/3	—	• Risk perception: general & personal

\* Significant results in two evaluation studies of IPSY. Expectation regular use: tobacco became significant once in the block course intervention.

It should be emphasized that in the evaluations of ALF and IPSY, more than half of the measurement instruments used are already published scales. In the evaluations of the F&S and L-Q programs, newly designed tools have been used for the most part, and in the case of Rebound, completely.

Looking at the entire observation period in the individual studies from the start of the intervention to the end of the follow-up, IPSY is the most thoroughly studied program with a period of 4.5 years and six measurement points (including pre-test) (Table 4). Especially the results on the instrument Proneness to illicit drug use: Cannabis & Ecstasy are worth mentioning. The mean effect mentioned above has been measurable until the end of the observation period, four years after the end of the intervention. The programs ALF (four measurement points over 32 months), L-Q (three measurement points over 15 months) and F&S (three measurement points over 16 months) have been evaluated over a shorter period. Of these, the evaluation of L-Q stands out as four of the six instruments used measured a significant outcome. Two of these results in particular stand out: the Willingness to quit smoking and Self-esteem scales show a significant difference between intervention and control classes for girls. This difference does not occur immediately after the end of the intervention, but six months later. The Rebound program was studied for the shortest period, with a total observation period of ten months and two measurement points (pretest

and posttest). In its evaluation, two effects are found in the area of general and personal risk perception.

The review of the individual program evaluations and their results makes it possible to assign the LSPs to facets of the self in which an increase in skills has been demonstrated so far (Figure 5). Skills that can be assigned to the affective-evaluative facet of the self have been promoted in the programs L-Q, IPSY and Rebound, whereby the most effects (two, including a validated scale on Self-esteem) are found in L-Q and the longest effects (48 months follow-up) in IPSY. In the domain of the dispositional & dynamic facet of the self, effects are shown for the programs L-Q, ALF, and IPSY. Only for the cognitive descriptive facet of the self no effect has been shown so far for any program.

#### 4. Discussion

##### Summary of main results

While the effectiveness of addiction prevention LSPs on consumption behavior is well established [30], this work is the first to comparatively examine the effectiveness of LSPs in promoting life skills. The main findings are:

- Six comparable addiction prevention LSPs and ten associated program evaluations with 20 reports have been identified according to the inclusion criteria.
- The LSPs show similar content but differ in their temporal scope between 600 min (Unplugged) and 3150 min (L-Q). The intervention duration in the individual evaluation studies varies between four months (F&S 1), six months (IPSY 1 & 3 and Unplugged) and a whole school year (ALF, F&S 2, L-Q and Rebound). In one case, a three-day block course has been conducted (IPSY 2).
- The study quality of the evaluation studies has been assessed as good using the ROBINS-I tool. Individual exceptions have been noted in the measurement of outcomes, assignment to intervention and control groups, and adherence to the intervention plan. Evaluations of F&S, Rebound and Unplugged are of higher risk of bias than the evaluations of ALF, IPSY and L-Q.
- The evaluation studies prove to be heterogeneous in terms of school type, regional location, gender distribution, and the measurement instruments used.
- Interpersonal life skills have not been evaluated.
- Individual aspects of intrapersonal life skills have been examined with various instruments, although no instrument used could be directly assigned to a life skill.
- The promotion of intrapersonal life skills has been studied to varying degrees in the individual program evaluations. The differences include, for example, the number of instruments and measurements performed. Looking at the number of instruments used, the following ranking emerges: ALF ( $n = 14$ ), IPSY ( $n = 13$ ), R & S ( $n = 5$ ), L-Q ( $n = 5$ ), Rebound ( $n = 3$ ), and UNPLUGGED ( $n = 0$ ). Furthermore, there is methodological heterogeneity in terms of follow-up periods, which vary from six months (F&S 2, L-Q) to 48 months (IPSY 1). In two evaluations (F&S 1, Rebound), only one pretest and one posttest have been performed.
- Due to the lack of life skills measurements in the evaluation of the Unplugged program, it is not reported on further.
- Only the assignment of applied measuring instruments of life skills to the three facets of the self has enabled a comparative view of the evaluation results.
- It has been shown that the three facets of the self have been studied differently. Most measurements refer to the affective evaluative facet of the self, followed by the dispositional & dynamic facet. The cognitive descriptive facet of the self has been measured in a single case.
- A total of 38 instruments of varying proven quality has been used to evaluate life skills (affective evaluative facet of the self:  $n = 22$ , of which validated:  $n = 8$ , dispositional & dynamic facet of the self:  $n = 15$ , of which validated:  $n = 10$ , cognitive descriptive facet of the self:  $n = 1$ , validated).

- Overall, the evaluations of the IPSY and L-Q programs show effectiveness in promoting the affective evaluative as well as the dispositional & dynamic facet of the self. While for Rebound effects only in the affective evaluative and for ALF only in the dispositional & dynamic facet of the self are reported.
- A significant promotion of skills has been measured with the already validated measurement instruments in the area of the affective evaluative facet of the self with “Expectation regular use: tobacco” (IPSY) and “Self-esteem 2” (L-Q) as well as in the area of the dispositional & dynamic facet of the self with “Resistance to Peer Pressure” (IPSY) and “Life Skills Resources” (ALF).

In addition, other aspects emerge for discussion. First, a comparative view of evaluation results in the area of life skills between individual program evaluations reveals “blind spots.” These relate to what was measured and how it was measured. What is measured refers to which aspects of Life Skills have been measured and which have not. How something was measured refers to the quality of the measurement instruments and the heterogeneity of the samples. Second, further methodological limitations arise from diverse measurement instruments that are not specifically designed to measure life skills, heterogeneity in terms of the measurement instruments used in the individual evaluations, and heterogeneity in the different samples, as evidenced, for example, by sample size, gender differences, and different settings.

#### 4.1. Quality of Evidence

The quality of the intervention studies considered has been assessed by assessing risks of bias but also by looking at the measurement tools used. At the level of bias risks, the reported studies appear to be essentially methodologically well conducted. The risks of bias due to incorrect assignment, deviation from the intervention plan, and missing data, which occurred sporadically in the studies, are essentially expected because these are field studies. In these field studies an intervention has been integrated into the regular school day, which means that program implementation can be influenced by many factors. The composition of school classes also fluctuates, especially at the beginning of lower secondary school. In three studies of the programs ALF, F&S and L-Q, and Rebound, there has been a risk due to drop-out differences between intervention and control groups [35,37,47]. These differences appear critical in the case of the evaluation of Rebound and could lead to an overestimation of the program’s effectiveness with regard to results on consumer behavior [47]. However, effects in this area have not been reported in this study [47]. One study each of F&S [37] and Unplugged [50] have identified risks of bias due to unclear program implementation in the interventions, which could lead to underestimation of program effects. Neither study has used instruments on facets of the self.

A general risk of bias arises from the nature of measurement, since self-report questionnaires are used. However, due to the subject matter, it is generally not possible to do without them. In individual cases, e.g., when recording consumption behavior, the quality of the self-report can be improved by measuring the carbon monoxide content of the breathing air (as in [35]). For measuring life skills, a new quality of measurement could be achieved by solving challenging tasks. Such measurement tools would allow to capture the advancement of skills through their direct application, for example, by solving problems using typical case studies as examples. In addition, the instruments used in evaluations may contribute to bias risk. As shown in Chapter 3.6.1, the three facets of the self have been studied with varying degrees of intensity. This is reflected in the number of instruments used. For example, the cognitive descriptive facet of the self has been surveyed with only one instrument, whereas the affective evaluative ( $n = 22$ ) and the dispositional & dynamic ( $n = 15$ ) facets have been surveyed with considerably more instruments (Tables 6–8).

#### 4.2. Comparative Effectiveness of LSPs

Heterogeneity in measurements makes it difficult to directly compare the effectiveness of the six LSPs considered. The facets of the self have been found to be appropriate here to allow comparison of different LSP evaluations. In summary, results could be formulated that suggest an influence of LSPs on the affective evaluative facet of the self, but also on the dispositional and dynamic facet of the self. The life skills approach postulates that health-promoting behavior occurs when several conditions are met: Knowledge about or attitudes toward risky behaviors, life skills, and behavioral training [12]. In this work, an approach is used to test whether LSPs can satisfy these conditions. Through comparative examination, evidence has been found that the affective evaluative facet of the self is promoted by LSPs. This has been demonstrated in evaluations of the programs IPSY, L-Q and Rebound. It appears that these three programs can contribute to attitude and value education. According to the theory of planned behavior, this attitude formation is a prerequisite for future health-promoting behavior [21,68].

The contribution of the programs L-Q, IPSY, and Rebound to life skills reported here fits with previously reported effectiveness in the area of consumer behavior. Thus, previous evaluations have been shown to promote negative attitudes toward tobacco and tobacco use [47,52,59]. This is in line with the changes in smoking behavior that have already been reported in reviews [16,30]. The evaluation of the program L-Q has also measured a change in the Willingness to quit smoking scale in girls. This effect did not appear immediately after the end of the intervention to the post-test, but developed until the end of the follow-up, 6 months after the end of the intervention [52]. A similar dynamic has been found for the Self-esteem 2 scale. This could be an indication that the intervention participation has stimulated processes that unfold or strengthen over time.

Comparable effects in the area of attitude toward alcohol have not become significant [44,45,54]. Also, no effects on knowledge about alcohol have been reported in the evaluation studies. This contrasts with program effects of LSPs on alcohol consumption behavior. These effects are reported by a meta-analysis that has found a smaller increase in lifetime prevalence of alcohol use and a lower risk of current use at the end of the intervention [30].

Looking comparatively at attitude change with respect to alcohol, tobacco, and illicit drugs, it appears that LSPs are generally good at changing attitudes toward tobacco (Table 9). A medium effect in attitudes toward cannabis and ecstasy, still found 48 months after the end of the intervention, shows a lasting impact of the IPSY program on attitudes toward illicit drugs [36]. The question remains as to why a comparable result could not be demonstrated for attitudes towards alcohol, even though program effectiveness for reducing alcohol consumption has been demonstrated [30].

Improvement in outcomes attributable to the dispositional & dynamic facet of the self has been found in the three programs, L-Q, ALF, and IPSY. In this comparison, the results of the evaluation of L-Q appear striking (see chapter 3.6.2). Improvement in the Social competence 2 scale has been noted in both fifth and seventh graders. This improvement already occurs at post-test, but develops differently by the end of follow-up [52]. For seventh graders, the measured program effect decreases toward the end of follow-up, while it continues to increase for fifth graders. This development can be discussed in different ways. First, the program L-Q appears to be effective in teaching social skills, especially to girls. Also, the subsequent growth observed here among fifth-grade girls may indicate that they are more receptive to learning basic skills taught by the program and subsequently practicing them outside the program. In addition, the onset of puberty could be discussed as a reason for the smaller program effects.

In the evaluations of the programs ALF and IPSY, the Life skills resources scale has been used (Table 7), and only for ALF a significant increase has been measured in intervention classes [45]. In this scale, action dispositions such as self-efficacy expectations are addressed (Table A16). The question arises whether this difference can be explained by the sample or by methodological implementation of the content. Other small effects are reported for IPSY in the Resistance cigarette and Resistance to peer pressure scales, suggesting that the program initiates general steadfastness strategies.

Overall, small or moderate effects have been reported in the evaluation studies of the LSPs examined here (Tables 6 and 7). However, since life skills are understood as competencies that can be applied throughout life, once they have been acquired, they have an effect throughout the lifespan. Moreover, they are not addiction prevention-specific, but are transferable to other areas of life and can promote overall health. Therefore, even a small gain in the biography could have a great effect on a health-promoting lifestyle. Especially in view of small effects, it should be discussed whether LSPs should be applied as early as possible to anticipate and delay critical health behavior and to maximize personal and societal benefits.

#### *4.3. Differentiation of the LSPs Due to Program Design and Proven Effects*

As described in Section 3.2, the LSPs are similar in terms of time and content. However, the program structures and the results of the evaluations reveal unique selling points (see Section 3.2), which are discussed below. The effects shown in an evaluation of the program ALF [46] in a Life skills resources scale (Tables 9 and A16) indicate that versatile coping strategies have been taught, which can be assigned to the dispositional & dynamic facet of the self. The scale includes, among other things, assessment of self-awareness and self-observation. This fits with a program structure that includes content for practicing self-regulation in every single session [63].

In F&S, no effects could be detected in areas of life skills. This is surprising because the evaluations have found effects in relation to knowledge about tobacco [53], as well as the prevalence of alcohol and tobacco consumption [37]. Perhaps a lack of the presumed effects can be explained by a greater diversity of the participating student populations from Austria, Denmark, Germany, and Luxembourg as well as by inconsistencies in the implementation of the program. This is because, unlike the other programs, F&S does not include train-the-trainer training as a matter of principle. In health education, this training of trainers is seen as a quality feature for the adequate implementation of health-promoting interventions.

The program IPSY has been able to promote resistance in various forms in the short term. This has been shown in Resistance to cigarette offers at post-test [56] and Resistance to peer pressure until the first follow-up [60]. This is noteworthy because even a temporary effect in the area of steadfastness can help delay initial use, in line with the goal of the life skills approach.

From the evaluation results of L-Q [52] it can be deduced that girls seem to benefit particularly and that the development of skills is initiated that are consolidated in the further biography.

The program Rebound integrates peer mediation into the life skills approach to addiction prevention [69]. Through peer interaction, there is an opportunity to acquire self-reflective skills. This may be one reason for the demonstrated promotion of general and personal perceptions of risk related to substance use (Table 8). Since potential mentors can also report on consumption experiences, the target group must be carefully selected.

#### *4.4. Blind Spots*

In addition to the previously reported program effects, the comparative examination of the LSPs has revealed blind spots with regard to the effectiveness studied to date. These are, on the one hand, what effects have been measured and, on the other hand, how they have been measured.

Thus, no significant improvement has been found for the cognitive descriptive facet of the self, which is examined with a “social support” instrument [44]. Nevertheless, it is assumed that there could be a promotion of skills that can be attributed to this area of the self for two reasons. The first reason is that the facets of the self are mutually dependent. Thus, forming an attitude changes one’s knowledge about oneself and learning skills changes one’s knowledge about one’s abilities. This is evidenced by social cognitive theory, in which metacognitive knowledge about one’s own abilities is a basis of self-efficacy expectancy [19] and the theory of planned behavior, which describes attitude as a prerequisite for behavior, which in turn can result in changed abilities [21]. The second reason is that the development of metacognitive knowledge about oneself is specifically promoted in all programs through work assignments. The following work assignments illustrate this: “In which situation do you feel comfortable? How can you tell?” (ALF Unit 2); “How do I learn?” (IPSY Unit 12).

Another blind spot that arises from the question of what was measured is the lack of measurement of the expression of interpersonal life skills, such as communication skills, empathy, and the establishment and maintenance of friendly relationships. Measurement of interpersonal skills would be possible, for example, by monitoring an interaction (e.g., through videography) or through challenging tasks. In addition, there are two reasons why the programs promote interpersonal skills. First, there are results from a qualitative evaluation that show the increase in knowledge about communication [45]. Second, due to the cooperative methods provided for in the LSP manuals (e.g., fishbowl in the Rebound program), it can be assumed that a learning effect could take place especially in the area of interpersonal life skills (e.g., [66,67]). Therefore, future evaluations should pay special attention to these skills.

The question of how measurement was done aims at the use of adequate measurement instruments. Here, the lack of consensus on appropriate measurement instruments and the validity of the instruments in relation to the individual LSPs seem particularly relevant. There is still a lack of standardized measurement tools to capture life skills, as evidenced by the fact that the use of 38 different measurement tools for aspects of life skills has been reported in this paper. The measurement instruments appear to have varying degrees of coherence with the content implemented in evaluations. A good fit between content and instruments used is evident in the evaluation of L-Q, where the areas “Me and my new group” and “Strengthening self-confidence” have been implemented. Scales for social competence and self-esteem are used to match this. Here, the question arises whether well-suited instruments already exist that could also be applied to evaluations of other programs. A content analysis of the program manuals could be used to reanalyze the fit of existing instruments to the manuals of the LSPs and to formulate recommendations for a choice of adequate instruments.

Furthermore, it has already been discussed (cf. [30]) and suggested to establish comparability by agreeing on result categories. For the first time, this work presents such a proposal, which refers to facets of the self as the site of action of intrapersonal skills. In the long run, the quality of evidence could be improved by a uniform use of measurement instruments for life skills. Also conceivable in individual cases is the observation of processes instead of asking for a self-report. On a small scale, competence measurements have already been carried out in this way for LSPs [70].

The use of different measurement instruments and the setting of different foci of the individual evaluations, as well as a lack of consensus on the operationalization of life skills, result in further fuzziness in the evidence. The question can be asked whether the full potential of LSPs has been validly captured so far, or whether potentials have been overlooked. In the U.S., where LSPs have been established since the 1980s, it has been found that program evaluations often measure different outcomes than the programs intend to achieve according to their conception [71]. This question can also be explored for German-language LSPs. A further step could be to investigate whether, in addition to the goals of the programs, the content has also been validly mapped by evaluations, since coherence between goals, content, and teaching methods cannot be taken for granted [72].

As discussed above, it is obvious that metacognition and communication are neglected in the evaluations, while they are applied in the programs. A comprehensive examination of the validity of applied measurement instruments requires a content-analytical evaluation of the LSP manuals with a focus on the competencies that can be promoted by the respective programs. The validity check can subsequently be related to the results of the associated program evaluations.

#### 4.5. Limitations

This work has methodological limitations due to the selection of publications considered, the heterogeneity of individual studies, the assessment of bias risks, and the lack of uniformity in measurement instruments.

The first limitation is the selection of relevant publications. A systematic literature search has been conducted in an attempt to identify all evaluations of addiction specific LSPs according to the inclusion criteria. However, the risk of publication bias cannot be excluded. It is noticeable that no evaluation study reports the absence of significant results. There are also few negative results found in international reviews of life skills interventions; this may indicate a general publication bias [73]. In addition, the limitation to evaluation studies of German-language programs also seems worth mentioning in this context. This was done in order to test the proposal presented here for the comparability of the variety of instruments used to measure individual aspects of life skills first on a small sample with a comparable cultural frame of reference. And furthermore, German-language interventions have so far been poorly represented in international reviews [30]. Limiting a manageable number of LSPs also enables the realization of the requirement discussed above, namely, to examine the extent to which there is coherence between the goals, content, and teaching methods of the programs and the evaluation instruments used. Results of these investigations would first describe more precisely the blind spots in the evaluations mentioned above and thus provide a significant contribution to the development of adequate instruments for measuring life skills [33].

The second limitation is the heterogeneity of the individual evaluations. There are differences in sample size, type of school, region, and age of pupils. In particular, school type is a strong predictor of tobacco use behavior [74]. For alcohol consumption, the data situation is unclear [75]. Heterogeneity within individual studies should also be mentioned as a limitation. In one evaluation study, different developments have been found between the classes studied. Participant observation has been suggested as a way to assess these differences [76].

The third limitation is the use of a risk of bias tool developed for nonrandomized clinical trials [77]. This selection has been made because quasi-experimental studies are included in addition to randomized controlled trials. An editorial adjustment has been made for application to school-based intervention studies in the field. In addition, there may be other relevant bias risks not detectable by the ROBINS-I tool. Conceivable here are spill-over effects between intervention and control classes of the same school and setting effects [78]. It is conceivable that schools that participate in evaluations of an LSPs provide a particularly conducive environment for implementing health promotion that could also be effective in control classrooms.

In order to establish comparability between the evaluations, the lack of uniformity of the evaluation instruments for life skills has been addressed in this work by assigning existing measurement instruments to the three facets of the self (Figure 5). However, the self is not a fixed construct, but the subject of current psychological discussion (for example [23,25,28,79]). Therefore, methodological limitations arise from this assignment, because, if necessary, the facets could be further subdivided or supplemented.

#### 4.6. Conclusions

It has been shown across different LSPs that they can induce not only behavioral outcomes but also changes in life skills. This is relevant for several reasons:

- As of now, the health-promoting potential of LSPs already appears to be greater than the effects in the area of health behavior that have been proven so far. In order to be able to systematically capture this potential, a consensus is needed on the procedure for evaluations. This refers to the study design and especially to the selection of standardized, valid measurement instruments for life skills [80].
- Life skills are general competencies that contribute to coping with everyday challenges. They have a protective effect not only in relation to addiction. They generally serve to reduce behavior-related health risks [12].
- This could make them particularly relevant in a world that is becoming increasingly characterized by uncertainties. Key social problems are coming to a head and require sustainable solutions. Life skills could provide both individual and societal benefits.
- At the individual level, they can contribute to constructive coping with stress, effective communication, self-regulation, and decision-making in a dynamic world. Harmful coping behaviors can be reduced, which has an impact on both physical and mental health.
- Societal benefits could result from even small improvements in life skills. This could have a major impact on health-promoting behavior over the lifespan, reducing the burden of disease and thus the health care system.
- In addition, the training of core life skills (e.g., self awareness, critical thinking, decision making) can contribute to the formation and reflection of individual and social values. They can therefore contribute to democratic competence in general.
- Specifically, e.g., role adoption (empathy), the ability to deal with conflict (coping with stress & emotions, self-awareness, communication, interpersonal relationship skills), sociological analysis (critical thinking, creative thinking), political judgment (decision making, critical thinking) and the ability to participate (decision making, problem solving) can contribute to democratic maturity.

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## Appendix A

**Table A1.** Sources searched and search strategies for identification of life skill programs.

Source	Search Strategy	Hits
ERIC MEDLINE PsycINFO PSYINDEX	AB school OR AB classroom OR AB school-based OR school-setting AB skill training OR training program OR AB evaluation OR AB prevention OR AB intervention OR AB education OR health promotion OR educational intervention OR life skills AB RCT OR AB randomized controlled trialr OR AB quantitative OR AB control OR AB pre OR AB post OR AB quasi-experiment OR AB quasi-experimental OR AB follow-up OR AB meta-analysis OR AB review TX german OR TX Germany OR TX german language OR german speaking AB stress management OR AB coping OR AB anxiety OR AB depression OR AB emotion OR AB awareness OR AB problem solving OR AB life skills OR AB peer pressure OR AB assertive behavior OR AB behavior problems OR AB externalizing behavior OR AB motivational enhancement OR AB life coping skills OR AB decision making OR AB mental health OR AB coping strategy OR AB social skills OR AB social competence OR AB perspective taking or perspective-taking OR AB behavior adjustment OR AB social support OR AB self-efficacy OR AB stress management OR AB emotional self-control OR AB emotional self-regulation OR AB psychosocial problems OR AB awareness training OR AB self-reflection or self-evaluation or self-awareness OR AB goal setting OR AB well-being or wellbeing or well being OR AB antisocial behavior OR AB social learning OR AB emotional learning OR AB alcohol OR AB smoking OR AB drug addiction or drug abuse or substance abuse	ERIC: 178 MEDLINE: 755 PsycINFO: 2078 PSYINDEX: 470
FIS-Bildung	Schlagwörter: LEBENSKOMPETENZ oder Schlagwörter: LIFE und SKILLS oder Freitext: LEBENSKOMPETENZ * oder Freitext: "LIFE SKILLS" Schlagwörter: SCHUL *	114
		Total: 3595

**Table A2.** Sources searched and search strategies for identification of program evaluations.

Source	Search Strategy	Hits
ERIC MEDLINE PsycINFO PSYINDEX	TX Lebenskompeten * OR TX Kompetenz OR TX Programm OR TX life skill * OR TX competence OR TX program * TX unplugged OR TX rebound OR TX alf OR TX Lions Quest OR TX IPSY OR TX "Fit und Stark" Limiters—Published Date: 19940101–20210331; Publication Year: 1994–2021	ERIC: 137 MEDLINE: 1416 PsycINFO: 327 PSYINDEX: 77
FIS-Bildung	Freitext: Unplugged; Freitext: Rebound; Freitext ALF; Freitext IPSY; Freitext: Lions Quest, Freitext: "Fit und Stark"	478
		Total: 2435

## Appendix B

Table A3. Identified health promotion programs.

<i>n</i>	Name of Program	Setting	Target
1	ALF	Secondary school I	Addiction prevention
2	FRIENDS	Primary school	Anxiety disorder
3	Anti-Stress-Training	Primary school	Stress prevention
4	Balu und Du	Primary school	unspecific
5	Be smart—Don't start	Secondary school I: competition	Addiction prevention
6	EFFEKT	Preschool	Social behavior
7	Emotionsregulationstraining für das Kindesalter	Primary school	Emotional regulation
8	Emotionstraining in der Schule	10–13 years old	Depression
9	fairplayer.manual	Adolescence	Bullying
10	Familien stärken	13–17 years old & families	Addiction prevention
11	Faustlos	Kindergarten/Primary school	Violence prevention
12	FearNot!		Bullying
13	Fit Kids—fittes Kinder, fittes Kaufbeuren	community-oriented	Addiction prevention
14	Fit und Stark 1 & 2	1st & 2nd grade	unspecific
15	Fit und Stark 3 & 4	community-oriented	Addiction prevention
16	Fit und Stark 5 & 6	Secondary school I	Addiction prevention
17	Friedliches Miteinander in Streitsituationen	Primary school	Social and emotional learning
18	Heidelberger Kompetenztraining (HKT)	Youth athletes	Doping prevention
19	IPSY	Secondary school I	Addiction prevention
20	JobFit	End of school	Unspecific
21	Klar bleiben	10th grade	Binge drinking
22	Klasse 2000	Primary school	Addiction prevention
23	LARS & LISA	Secondary school I	Depression
24	Life Skills Through games	Not specified	Unspecific
25	Lions Quest: eigenständig werden	Not specified	Unspecific
26	Lions-Quest: erwachsen werden	Secondary school I	Addiction prevention
27	LISA-T	8th grade	Depression
28	MaiStep	Secondary school I	Eating disorder
29	Medienhelden	Secondary school I	Cyberbullying
30	MIndMatters	Entire school	School climate
31	PeP	Pupils with special needs	Addiction & violence prevention
32	ProACT + E	Secondary school I	Bullying
33	Rebound	Secondary school I	Addiction prevention
34	Surf fair	Secondary school I	Cyberbullying
35	TIP	2nd & 3rd grade	Problem solving
36	TRIPLE P	Not specified	Mental health
37	Unplugged	Secondary school I	Addiction prevention
38	Verhaltenstraining in der Grundschule	3. und 4. Klasse	Social competence
39	ViSC	5 – 8. Klasse	unspecific

**Table A4.** Excluded hits.

Study	Reason
[33]	Review contains an evaluation, which was considered in this work
[63]	Program manual (ALF)
[66]	Program manual (IPSY)
[62]	Program manual (L-Q)
[81]	No evaluation
[82]	No evaluation
[83]	No evaluation
[84]	No life skills program evaluated
[85]	No life skills program evaluated
[86]	Review on US-American evaluations
[87]	No German language program
[88]	Review contains an evaluation, which was considered in this work
[89]	No German language program
[90]	No German language program
[64]	No measurement in outcomes of interest
[91]	Program manual (Fit und Stark)
[92]	Evaluation study in elementary schools
[93]	No German language program
[94]	No German language program
[95]	No evaluation
[96]	No evaluation
[97]	No evaluation
[98]	No control group design
[99]	No evaluation
[100]	No evaluation
[101]	No measurement in outcomes of interest

## Appendix C

**Table A5.** Data extraction.

ALF 1 [35,44]		
Methods	Study design:	quasi-experimental study
	Duration from start of intervention:	32 months
	Drop-Out:	18.8%
Population	Randomization type n randomized clusters	School classes
	n intervention:	Not specified
	n control:	Not specified
	n total (Cluster):	26 school classes
	Population at end of study	436
	n intervention:	230
	n control:	206
	Total (t <sub>0</sub> ):	675
	Average age:	10.4
	Gender (female):	45.5%
	Further characteristics	Urban area schools

Table A5. Cont.

ALF 1 [35,44]	
Intervention	ALF
	Pilot study with the aim to collect data on behavioral out-comes (tobacco, alcohol, drugs), attitudes towards drugs, class climate and competence in order to draw conclusions on program effectiveness.
	Measurements: Pre-Posttest + 2 FU-Tests
	Compliance 100% of contents
	Intervention duration 8 months
	Frequency (hours/week) 5th class: 12 × 90 min./school year 6th class: 6 × 90 min./school year 7th class: 6 × 90 min./school year
	Train the trainer-workshop yes, 2 two-day trainings
	Control: Regular lessons
Outcomes significant group differences	Post-Test: 8 months: - 30-day-consumption frequency tobacco: 6.9% difference. FU: 20 months: - Lifetime drunkenness experience: 9.3% difference.
Outcomes not significant	Expected consequence: tobacco Expected consequence: alcohol Expected consequence: drugs Attitude towards alcohol Attitude towards cannabis Attitude towards smoking Social support Cannabis consumption Self-efficacy Knowledge about drugs Self-esteem Helplessness Social competence Classroom climate Resisting peer pressure Lifetime consumption frequencies alcohol + tobacco 30-day-consumption frequency alcohol

**Table A6.** Data extraction.

ALF 2 [45,46]		
Methods	Study design:	Cluster randomized study with quantitative and qualitative surveys
	Duration from start of intervention:	24 months
	Drop-Out:	30.3%
Population	Randomization type n randomized clusters	School classes
	n intervention:	Not specified
	n control:	Not specified
	n total (Cluster):	26 school classes
	Population at end of study	448
	n intervention:	247
	n control:	201
	Total (t <sub>0</sub> ):	753
	Average age:	10.8
	Gender (female):	49.8%
	Further characteristics	Urban area schools
Intervention	LSP	ALF Quantitative survey: knowledge about life skills; Qualitative survey: application of life skills
	Measurements:	Pre-Posttest + 1 FU-Tests
	Compliance	84% of contents
	Intervention duration	12 months
	Frequency (hours/week)	5th class: 12 × 90 min./school year 6th class: 8 × 90 min./school year
	Train the trainer-workshop	yes, 2 two-day trainings
	Control:	Regular lessons
Outcomes significant group differences	Qualitative Outcomes Posttest: 12 months: - Application of conversation rules OR = 2.87 FU: 4 months: - Application of relaxation rules OR = 4.23 Quantitative Outcomes FU: 24 months: - Knowledge about problem solving, d = 0.018 - Knowledge about communication, d = 0.033 - Knowledge about self-confident behavior, d = 0.023 - Life skills: resources, d = 0.028	
Outcomes not significant	Life Skills: deficits	

**Table A7.** Data extraction.

<b>F&amp;S 1 [53]</b>		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	15 months
	Drop-Out:	12.5%
Population	Randomization type n randomized clusters	School classes
	n intervention:	55 classes
	n control:	51 classes
	n total (Cluster):	106 classes
	Population at end of study	not specified
	n intervention:	921
	n control:	704
	Total (t <sub>0</sub> ):	1858
	Average age:	11.49
	Gender (female):	48.1%
	Further characteristics	Study in three European countries
Intervention	LSP	F&S
	Measurements:	Pre- and posttest
	Compliance	78.1%
	Intervention duration	4 months
	Frequency (hours/week)	45 min/week
	Train the trainer-workshop	none
	Control:	Regular lessons
Outcomes significant group differences	FU: 15 months:	
	- Knowledge about tobacco OR = 1.12 - Classroom climate OR = 1.24	
Outcomes not significant	Attitudes towards smoking	
	Perceived positive consequences of smoking	
	Susceptibility to smoking	
	Social competence	

**Table A8.** Data extraction.

<b>F&amp;S 2 + L-Q [37]</b>		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	16 months
	Drop-Out:	23%
Population	Randomization type n randomized clusters	Schools
	n intervention:	31 schools, 46 classes
	n control:	16 schools, 45 classes
	n total (Cluster):	47
	Population at end of study	1056
	n intervention:	not specified
	n control:	not specified
	Total (t <sub>0</sub> ):	1370
	Average age:	not specified
	Gender (female):	47.1%
	Further characteristics	low socioeconomic status, two LSPs were implemented.
	Intervention	LSP
Measurements:		Pre-posttest + 1FU test
Compliance		At least 60%
Intervention duration		1 school year
Frequency (hours/week)		1 lesson per week
Train the trainer-workshop		none
Control:		Regular lessons
Outcomes significant group differences	FU: 16 months:	
	- 30-day-consumption frequency: tobacco F = 7.95; p = 0.00 - 30-day-consumption frequency: alcohol F = 3.74; p = 0.02	
Outcomes not significant	Self-Efficacy	
	Social competence	

**Table A9.** Data extraction.

IPSY 1 [36,54–58]		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	4.5 years
	Drop-Out:	29%
Population	Randomization type	schools
	n randomized clusters	
	n intervention:	23
	n control:	21
	n total (Cluster):	44
	Population at end of study	not specified
	n intervention:	not specified
	n control:	not specified
	Total (t <sub>0</sub> ):	1692
	Average age:	10.47
	Gender (female):	52.9%
Further characteristics	none	
Intervention	LSP	IPSY
	Measurements:	Pre-posttest + 4FU tests
	Compliance	80%
	Intervention duration	6 months
	Frequency (hours/week)	15 × 90 min/week in 5th grade, 7 booster sessions in each 5th and 7th grade
	Train the trainer-workshop	1 day seminar
	Control:	Regular lessons
Outcomes significant group differences	Posttest: 6 months:	
	-	Expectation regular use: tobacco $F(1.278) = 12.09; p < 0.05; \eta^2 = 0.0417$
	-	30-day-consumption frequency: tobacco: $F(1.1234) = 6.22; p < 0.05; \eta^2 = 0.0050$
	-	Number cigarettes smoked/day: $F(1.1215) = 6.17; p < 0.05; \eta^2 = 0.0051$
	-	Knowledge about self-confident behavior: $F(1.1166) = 15.96; p < 0.001; \eta^2 = 0.0135$
	-	Resistance to Peer Pressure: $F(1.1166) = 13.8; p < 0.001; \eta^2 = 0.0117$
	-	School bonding: $F(1.1166) = 7.55; p < 0.01; \eta^2 = 0.0064$
Outcomes not significant	FU: 56 months	
	-	30-day-consumption frequency: alcohol: $d = 0.34$
	-	30-day-consumption frequency: tobacco: $d = 0.40$
	-	Proneness to illicit drug use: Cannabis & Ecstasy: $d = 0.44$
	-	Expectation regular use: alcohol
	-	Self-concept of general self-worth
	-	Self-concept of appreciation through others
-	Life Skills Deficits	
-	Life Skills Resources	
-	Self-concept of problem solving skills	
-	Self-concept of stability against groups	

**Table A10.** Data extraction.

<b>IPSY 2 [59]</b>		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	34 months
	Drop-Out:	3 persons
Population	Randomization type n randomized clusters	School classes
	n intervention:	4
	n control:	not specified
	n total (Cluster):	not specified
	Population at end of study	105
	n intervention:	62
	n peer intervention:	20
	n control:	23
	Total (t <sub>0</sub> ):	108
	Average age:	10.74
	Gender (female):	43.8%
	Further characteristics	Three arm intervention: teacher-lead, peer-lead, and control
	Intervention	LSP
Measurements:		Pre-posttest + 1 FU test
Compliance		100%
Intervention duration		1 week
Frequency (hours/week)		Full days
Train the trainer-workshop		1 day seminar
Control:		School newspaper project
Outcomes significant group differences	FU: 34 months	
	-	Expectation regular use: tobacco $\eta^2 = 0.0492$
	-	Resistance cigarette $\eta^2 = 0.0496$
	-	30-day-consumption frequency: alcohol: $d = 0.13$
Outcomes not significant	-	Resistance alcohol

**Table A11.** Data extraction.

<b>IPSY3 [60]</b>		
Methods	Study design:	Quasi-experimental study
	Duration from start of intervention:	18 months
	Drop-Out:	27%
Population	Randomization type n randomized clusters	schools
	n intervention:	not specified
	n control:	not specified
	n total (Cluster):	not specified
	Population at end of study	1131
	n intervention:	646
	n control:	485
	Total (t <sub>0</sub> ):	not specified
	Average age:	10.45
	Gender (female):	53.5%
	Further characteristics	Comparison of Italian and German pupils. Only German population was considered
	Intervention	LSP
Measurements:		Pre-posttest + 1 FU test
Compliance		80%
Intervention duration		6 months
Frequency (hours/week)		not specified
Train the trainer-workshop		1 day workshop
Control:		Regular lessons
Outcomes significant group differences	FU: 18 months	
	<ul style="list-style-type: none"> <li>- knowledge about assertive behavior <math>F(22,028) = 6.98, p &lt; 0.01</math></li> <li>- resistance to peer pressure <math>F(22,028) = 5.49, p &lt; 0.01</math></li> <li>- school involvement <math>F(22,028) = 6.17, p &lt; 0.01</math></li> </ul> Effect sizes: $d = 0.16$ – $d = 0.27$	
Outcomes not significant	<ul style="list-style-type: none"> <li>- Future consumption: alcohol</li> <li>- Knowledge about alcohol</li> <li>- 30-day consumption frequency: alcohol</li> <li>- knowledge about effective communication</li> <li>- Self-concept of problem solving skills</li> <li>- Self-concept of stability against groups</li> <li>- Self-concept of appreciation through others</li> <li>- Self-concept of general self-worth</li> </ul>	

**Table A12.** Data extraction.

<b>L-Q [52]</b>		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	15 months
	Drop-Out:	21.9%
Population	Randomization type	School classes
	n randomized clusters	
	n intervention:	not specified
	n control:	not specified
	n total (Cluster):	35 classes
	Population at end of study	761
	n intervention:	374
	n control:	387
	Total (t <sub>0</sub> ):	974
	Average age:	10.4 (5th grade); 13.0 (7th grade)
	Gender (female):	49% (5th grade); 45% (7th grade)
Further characteristics		
Intervention	LSP	L-Q
	Measurements:	Pre-posttest + 1FU test
	Compliance	75% (5th grade); 62% (7th grade)
	Intervention duration	9 months
	Frequency (hours/week)	16 × 45 min during 1 school year
	Train the trainer-workshop	3-day seminar
	Control:	regular lessons
Outcomes significant group differences	Posttest: 9 months	
	- Lifetime consumption tobacco OR = 2.3	
	Posttest: 9 months (5th grade)	
	- Social competence, girls $F(1.317) = 12.3; p < 0.02; \eta^2 = 0.0374$	
	FU: 15 months	
	- Willingness to quit smoking, girls $F(1.36) = 11.8; p < 0.02; \eta^2 = 0.0476$	
Outcomes not significant	FU: 15 months (5th grade)	
	- Self-esteem, girls $F(1.313) = 5.6; p < 0.02; \eta^2 = 0.0176$	
	- Social competence, girls $F(1.322) = 13.1; p < 0.002; \eta^2 = 0.0391$	
Outcomes not significant	- Readiness to try smoking	
	- Resistance certainty to refuse a cigarette offer	
	- 30-day-consumption frequency: tobacco	

**Table A13.** Data extraction.

<b>Rebound [47]</b>		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	10 months
	Drop-Out:	36%
Population	Randomization type	classes
	n randomized clusters	
	n intervention:	29
	n control:	19
	n total (Cluster):	48
	Population at end of study	723
	n intervention:	512
	n control:	211
	Total (t <sub>0</sub> ):	1125
	Average age:	14.8
	Gender (female):	51.9%
Intervention	Further characteristics	9th & 10th grade
	LSP	Rebound
	Measurements:	Pre-posttest
	Compliance	100%
	Intervention duration	5 months
	Frequency (hours/week)	16 × 90 min in one school year
	Train the trainer-workshop	Yes
	Control:	Regular lessons
Outcomes significant group differences	Posttest: 5 months	
	-	Risk perception: general: Cannabis non-consumers f = 0.1
	-	Risk perception: general: tobacco f = 0.14
	-	Risk perception: personal: tobacco, current smokers f = 0.14
Outcomes not significant	-	Risk perception: relative
	-	30-day consumption frequency: alcohol + tobacco + cannabis
	-	6-months-consumption frequency: alcohol + tobacco
	-	Last alcohol intoxication
	-	Binge-Drinking last month
	-	Risk perception: relative
-	Knowledge about alcohol, tobacco, and drugs	

**Table A14.** Data extraction.

<b>Unplugged [48–51]</b>		
Methods	Study design:	Cluster randomized study
	Duration from start of intervention:	24 months
	Drop-Out:	22.9%
Population	Randomization type n randomized clusters	Schools
	n intervention:	76
	n control:	62
	n total (Cluster):	138
	Population at end of study	5541
	n intervention:	2811
	n control:	2730
	Total (t <sub>0</sub> ):	7079
	Average age:	13.2
	Gender (female):	49%
	Further characteristics	Schools in 7 European countries
Intervention	LSP	Unplugged
	Measurements:	Pre-posttest + 1 FU test
	Compliance	not specified
	Intervention duration	3 months
	Frequency (hours/week)	12 × 90 min in 1 school year
	Train the trainer-workshop	3 days seminar
	Control:	regular lessons
Outcomes significant group differences	Posttest: 3 months	
	-	Daily smoking: POR: 0.7; (0.52–0.94)
	-	Drunkness, last 30 days: POR = 0.72; (0.58–0.90) for at least one event; POR = 0.69; (0.48–0.99) for three or more events
	-	30-day consumption frequency: cannabis: POR = 0.77; (0.60–1.00)
	FU: 18 months	
-	Drunkness during last 30 days: POR = 0.80; (0.67–0.97) for at least one event; POR = 0.62; (0.47–0.81) for three or more events	
-	Regular consumption: cannabis POR = 0.74; (0.53–1.00)	
Outcomes not significant	-	Lifetime consumption: tobacco
	-	Regular smoking
	-	Consumption of illegal drugs

## Appendix D

Table A15. Measurement instruments of the category “Affective evaluative facet of the self”.

Instrument	Reason for Categorization <sup>a</sup>	Items	Example	I <sup>b</sup>	S <sup>c</sup>
Attitude towards alcohol	Here, the attitude towards alcohol is directly queried.	12	Drinking alcohol is disgusting		[44]
Attitude toward cannabis	Here, the attitude towards hashish is directly queried.	12	Smoking hashish is super		[44]
Attitudes towards smoking 1	Attitudes towards tobacco are asked.	6	Smoking is exciting		[53]
Attitude towards smoking 2	Here the attitude towards smoking is queried directly.	16	Cigarette smoking is disgusting		[44]
Expectation regular use: alcohol	Assessment based on current attitudes toward alcohol.	1	How likely is it that you will drink on a regular basis during the next 12 months?	[102]	[54]
Expectation regular use: tobacco	Assessment based on current attitudes toward tobacco.	1	If you are going to smoke in the next 12 months, how often will you smoke? will that be?	[103]	[56]
Expected consequence: alcohol	This is an assessment on the topic of the impact of alcohol consumption. The basis for this is knowledge or ideas about drinking. These are put into a context of the own opinion.	28	With alcohol you can gain more confidence	[104] <sup>d</sup>	[44]
Expected consequence: drugs	This is an assessment on the topic of the impact of drug use. The basis for this is knowledge or ideas about drugs. These are placed in the context of one’s own opinion.	14	When you use drugs, you can have a say in your circle of friends		[44]
Expected consequence: smoking	This is an assessment on the subject of smoking. The basis for this is knowledge or ideas about smoking. These are put into a context of the own opinion.	15	Smoking helps to improve mood		[44]
Perceived positive consequences of smoking	An assessment of the consequences of smoking is asked. This results from knowledge or perceptions and the attitude towards smoking.	8	People who smoke have more fun		[53]

Table A15. Cont.

Instrument	Reason for Categorization <sup>a</sup>	Items	Example	I <sup>b</sup>	S <sup>c</sup>
Proneness to illicit drug use: Cannabis & Ecstasy	The attitude towards cannabis/ecstasy in general is asked.	2	How do you relate to . . . (cannabis, ecstasy)		[36]
Readiness to try smoking	Assessment based on current attitudes toward tobacco.	1	If you don't smoke, do you plan to smoke in the near future?		[52]
Resistance certainty to refuse a cigarette offer	Evaluation of a specific situation. Involves attitude toward drugs.	1	How easy or difficult do you find it to say no when someone offers you a cigarette and you don't want to smoke?		[52]
Risk perception general	It is about the assessment on the basis of previous knowledge or ideas.	3	how risky is it (a drug) for everybody		[47]
Risk perception personal	It is about the assessment on the basis of previous knowledge or ideas.	3	how risky is it (a drug) for me		[47]
Risk perception relative	It is about the assessment on the basis of previous knowledge or ideas.	3	how risky is it (a drug) for me compared with for other people?		[47]
Self-esteem 1	Personality traits are assessed and the general state of health is queried.	18	I like myself	[105]	[44]
Self esteem 2	The value that one ascribes to one's own person is queried.	8	On the whole, I am satisfied with myself.	[106]	[52]
Self-concept of appreciation through others	Assessing the value of perceived feedback by others.	6	My family mistrusts me	[107]	[54]
Self-concept of general self-worth	An assessment of the perceived value of one's own person takes place.	10	I am a nobody	[107]	[56]
Susceptibility to smoking	One's own attitude toward tobacco is the basis of this assessment.	2	Do you think you will be smoking cigarettes 1 year from now?	[108,109]	[53]
Willingness to quit smoking	Assessment based on current attitudes toward tobacco.	1	Do you plan to quit smoking in the near future?		[52]

Bold significant results in at least one evaluation study in this review; <sup>a</sup> Categorization by consensus in the working group; <sup>b</sup> instrument source; <sup>c</sup> study; <sup>d</sup> concerns four items of the scale; <sup>e</sup> concerns eight items of the scale.

**Table A16.** Measurement instruments of the category “Dispositional & dynamic facet of the self”.

Instrument	Reason for Categorization <sup>a</sup>	Items	Example	I <sup>b</sup>	S <sup>c</sup>
Helplessness	In general, situations are addressed that require action. It is true that knowledge about the person is also queried, which speaks for cognitive descriptive facet. However, there is an assessment of the expression of dispositions. This requires self-awareness.	5	I don't have the patience to deal with difficult problems endlessly.	[110]	[44]
Life Skills Resources	Different dispositions are queried, e.g., self-awareness & self-observation.	23	If someone tries to persuade me, I think about what they would get out of it.	[105] <sup>f</sup>	[45], [54]
Life Skills Deficits	Different dispositions are queried, e.g., self-awareness & self-observation.	13	It's hard for me to decide.		[45,54]
Resistance alcohol	Different dispositions are queried. Among them: Emotion regulation, self-related cognitions and action dispositions.	1	Imagine you are at a friend s party and his/her parents are away from home. After a short while, a friend of yours opens the bar and offers alcoholic drinks to everybody at the party. How would you react?		[59]
Resistance cigarette	Different dispositions are queried. Among them: Emotion regulation, self-related cognitions and action dispositions.	1	Not specified. Comparable to resistance to alcohol consumption		[59]
Resistance to Peer Pressure	It is asked about dispositions that constitute the steadfastness of the self.	8	When my friends put pressure on me, I give in quickly.	[111]	[54,56]
Resisting peer pressure	The complexity of the knowledge about the self that is queried here goes beyond cognitive descriptive facet of the self. The question implicitly asks about the stability of the self. This requires self-confidence in addition to self-regulatory skills.	5	In the peer group I sometimes do something forbidden that I otherwise would not do.	[105] <sup>e</sup>	[44]
self-concept of problem solving skills	If a concrete situation were asked, it could be cognitive descriptive. However, the handling of the described scenarios is to be recorded in general. This requires an assessment of underlying dispositions.	10	I try to run away from my problems.	[107]	[54,56]

Table A16. Cont.

Instrument	Reason for Categorization <sup>a</sup>	Items	Example	I <sup>b</sup>	S <sup>c</sup>
self-concept of stability against groups	If a concrete situation were asked, it could be cognitive descriptive. However, the handling of the described scenarios is to be recorded in general. This requires an assessment of underlying dispositions.	12	I have a hard time expressing my opinion in front of a larger group.	[107]	[54,56]
Self-efficacy 1	General requirements are asked for, which may require different dispositions. Since there is no specific focus on self-concepts, cognitive descriptive aspects are excluded.	15	In unexpected situations I always know how to behave.	[105]	[44]
Social competence 1	General requirements are asked for, which may require different dispositions. Since there is no specific focus on self-concepts, cognitive descriptive aspects are excluded.				
Self-Efficacy 2	Self-efficacy expectancy is the disposition to act, to solve new or complicated problems based on one's own competencies.	5	For every problem I can find a solution.	[112] <sup>g</sup> [113] <sup>h</sup> [114] <sup>i</sup>	[37]
Social competence 2	In exemplary scenarios, one's own behavior is assessed. This requires social competence, self-perception, self-efficacy expectations and other dispositions for action.	7	How easy or hard are the following things for you....: Saying "no" when someone asks you to do something you don't want to do.		[52], [37]
Social competence 3	General scenarios are asked for. The aim is to assess how easy these are for the students. In other words, the students are asked about their social competence—a disposition for action.	13	To talk in front of large groups.		[53]
Tobacco consumption intention	Implicitly questions dispositions to act but also regulatory ability.	1	Will you smoke in the next 12 months?		[56]

Bold significant results in at least one evaluation study in this review; <sup>a</sup> Categorization by consensus in the working group; <sup>b</sup> instrument source; <sup>c</sup> study; <sup>e</sup> concerns two items; <sup>f</sup> concerns three items; <sup>g</sup> concerns three items; <sup>h</sup> concerns one item; <sup>i</sup> concerns one item.

**Table A17.** Measurement instruments of the category “Cognitive descriptive facet of the self”.

Instrument	Reason for Categorization <sup>a</sup>	Items	Example	I <sup>b</sup>	S <sup>c</sup>
Social support	Here, elements of the social self are asked for [28]. It is about knowledge about social structures on which one can rely.	8	I have friends who stand by me even when I have done something stupid.	[115] <sup>d</sup>	[44]

<sup>a</sup> Categorization by consensus in the working group; <sup>b</sup> instrument source; <sup>c</sup> study; <sup>d</sup> concerns two items.

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