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REVIEW PAPER

A Comparative Review of Current Research Methods in Positive Psychology

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Abstract
The quality of research methods is of high importance for the development of Positive Psychology. This paper aims to evaluate the methodological quality by reviewing current research and previously emerged criticism and then comparing the results to another area of psychology. For this purpose, 250 studies in Positive Psychology and 187 studies in Educational Psychology were analysed using a category system adapted from a work-family research study. Some significant differences were observed. In contrast to Educational Psychology, Positive Psychology used less experimental and laboratory studies and more self-assessment measures. However, there were more similarities than differences between the two areas, e.g. distribution of the cross-sectional and longitudinal studies as well as the simple inferential statistics as the most commonly used technique for analysing data. In summary, the results showed some suggestions for improvement, but the overall quality of research methods in Positive Psychology was estimated as good. Based on the suggested areas for improvement, it is recommended to study more representative samples, apply other methods apart from the self-assessment and use more complex techniques to analyse data when conducting Positive Psychology studies.

Key words: *research methods, positive psychology, educational psychology, quality of methods, criticism of positive psychology*

Abstrait
La qualité des méthodes de recherche est d'une grande importance pour le développement de la psychologie positive. Cet article vise à évaluer la qualité méthodologique en passant en revue les recherches en cours et les critiques précédemment émises, puis en comparant les résultats à un autre domaine de la psychologie. À cette fin, 250 études de psychologie positive et 187 études de psychologie de l'éducation ont été analysées à l'aide d'un système de catégories adapté d'une étude de recherche travail-famille. Quelques différences significatives ont été observées. Contrairement à la psychologie de l'éducation, la psychologie positive utilise moins d'études expérimentales et de laboratoire et davantage de mesures d'auto-évaluation. Cependant, il y avait plus de similitudes que de différences entre les deux domaines, par exemple répartition des études transversales et longitudinales ainsi que des statistiques inférentielles simples en tant que technique d'analyse des données la plus couramment utilisée. En résumé, les résultats ont montré quelques suggestions d'amélioration, mais la qualité globale des méthodes de recherche en psychologie positive a été jugée bonne. Sur la base des pistes d'amélioration suggérées, il est recommandé d'étudier des échantillons plus représentatifs, d'appliquer d'autres méthodes en dehors de l'auto-évaluation et d'utiliser des techniques plus complexes pour analyser les données lors de la réalisation d'études en psychologie positive.

Mots-clés: *méthodes de recherche, psychologie positive, psychologie de l'éducation, qualité des méthodes, critique de la psychologie positive*

In psychological research, the quality of the research methods is highly important (Elmes, Kantowitz, & Roediger III, 2011). In the area of Positive Psychology (PP), several criticisms regarding the methodology have been identified (Cromby, 2011; McNulty & Fincham, 2011; Wong, 2017). Stimulated by these criticisms, this study aims to evaluate the methodological quality of PP. For this purpose, we conducted a review of the current research methods in PP and systematically analysed the quality of these methods to investigate whether the criticisms (Cromby, 2011; McNulty & Fincham, 2011; Wong, 2017) are justified. First, McNulty and Fincham criticized the rare use of longitudinal

designs, which implies that investigating the development of positive constructs is not possible. Second, PP is criticized for mainly referring only to individualistic cultures. Therefore, its research results lack universality and objectivity. Third, concerning the data collection methods, PP is criticized for overusing self-report which is not a valid and reliable approach. Fourth, regarding the methods and contents, PP is criticized for exclusively focusing on the positive.

As Hendriks, Schotanus-Dijkstra, Hassankhan, de Jong, & Bohlmeijer (2019) claim, PP studies need "a more rigorous methodological approach" (p. 24) to ensure high quality research. PP is comparatively a new research area in psychology already enjoying worldwide interest and progressing significantly (Azar, 2011; Seligman & Csikszentmihalyi, 2000; Warren, Donaldson, & Donaldson, 2017). For example, numerous interventions of PP for enhancing well-being and life satisfaction have proven to be beneficial and are already being practiced (Hone, Jarden, & Schofield, 2015). Therefore, it is relevant to ensure the development of PP as an empirically supported discipline. It is also of practical importance to deal with the criticisms regarding methodology in order to ensure the reputation of the previous results.

This study is based on the methodological review of Casper, Eby, Bordeaux, Lockwood, and Lambert (2007) who analysed 225 studies and used 210 articles of work-family research to determine the current state of research following several criticisms. They used a category system with the following six dimensions: 'sample characteristics', 'research designs', 'data collection methods, levels of analysis, and triangulation', 'techniques to analyse data', 'measurement of the variables', as well as 'work-family research design'. Based on their results, the authors presented recommendations regarding future research in this area.

In this study, articles from two journals of PP were analysed regarding a category system partly adopted from Casper et al. (2007). The definition of an absolute criterion allowing the measurement of 'good' and 'bad' is difficult. Thus, we included – different from Casper et al. – an already established area of psychology as a control group to evaluate the methodological quality and the comparability with other research areas of psychology. To select the other area, it is important to be aware of a definition of PP: Studying conditions which lead to a fulfilled life and "make life worth living" (Baumgardner & Crothers, 2009; Lopez & Snyder, 2009, p.67), PP is mainly concerned with exploring and establishing factors which help people to flourish. For example, Seligman and Csikszentmihalyi (2000) named hope, wisdom, creativity, future mindedness and spirituality as positive features (p. 5) PP is concerned with.

We decided on Educational Psychology (EP) as the control group. First of all, it is an application-oriented area of psychology. A comparison with experimental psychology would not have yielded informative results for the different viewpoints and methods in these two areas of psychology. Considering the traditional application-oriented areas of psychology, Clinical Psychology partially resembles PP, but its core focus and goals differ from those of PP since it studies deficits and symptoms rather than positive aspects and pursues cure of diseases and not improvement of well-being (American Psychological Association, 2019a). An area of Organizational Psychology has already been treated by Casper et al. (2007). EP deals with learning, teaching, motivation, and instruction (American Psychological Association, 2019b; Berliner & Calfee, 2004). It aims to understand the learning processes of all people, in many areas of life, and – due to its assumption of lifelong learning – about the whole life span. PP also refers to all people, age groups, and areas of life. Overall, we decided on Educational Psychology as the control group being the most similar to PP in its relevant assumptions, areas, and goals of all application-oriented areas.

As for PP, articles from two journals of the research area of EP were also analysed using the same category system. We chose articles from the journals issued from 2015 to 2017 since Warren et al. (2017) stated that there might be a change in the way research in PP was conducted at the beginnings and nowadays. We prefer to investigate the actual state of PP, not the development or history.

Our research questions were derived from criticisms regarding PP and are methodologically based on the study by Casper et al. (2007): Do PP and EP differ in the proportion of articles containing multiple studies, empirical studies and experiments? Do they differ in the proportion of measurement points (cross-sectional vs. longitudinal), in their environmental setting (laboratory vs. field) and sample characteristics? Do they differ in the proportion of self-report measures and simple vs. complex methods of data analyses? Based on the results, conclusions about the overall quality and shortcomings of the methods can be drawn.

METHOD

The method corresponds with a few exceptions to that of Casper et al. (2007). Similarities and differences are discussed in greater detail in the following sections.

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Table 1

Overall number of articles and number of analysed articles for The Journal of Positive Psychology (JoPP), the Journal of Happiness Studies (JoHS), the Journal of Educational Psychology (JoEP) and Learning and Instruction (LaI), including number of articles with multiple studies and number of analysed studies

	JoPP	JoHS		JoEP	LaI	
	Freq.	Freq.	Overall	Freq.	Freq.	Overall
Number of published articles	106	92	198	77	74	151
Excluded articles	1	1	2	2	4	6
Analysed articles	105	91	196	75	70	145
Articles with multiple studies	27	5	32	15	11	26
Analysed studies	150	100	250	102	85	187

Note. Analysed articles and articles with multiple studies do not add up to the number of analysed studies. Freq.=Frequency.

In this study, the analysis excluded corrected articles, editorials, and comments. Meta-analyses, theoretical articles, and qualitative studies were coded, but not further analysed because the dimensions and categories chosen for the analysis of the studies have little application to these types of studies. Like Casper et al. (2007), we analysed each study separately when the articles contained multiple studies.

Database: Selection of Articles

Altogether, we chose four journals (two for each area) for having high impact factors (2016, American Psychological Association; 2016, Elsevier; 2016, Springer; 2016, Taylor & Francis) and being important and influential in the area of PP respectively EP. Similarly, Casper et al. also chose important journals. Additionally, they searched databases using specific keywords.

For PP, all studies in the issues from 2015 and 2016 of The Journal of Positive Psychology and all studies in the issues from 2017 of the Journal of Happiness Studies were analysed. For EP, all studies in the issues from 2016 of the Journal of Educational Psychology and all studies in the issues from 2017 of the journal Learning and Instruction were analysed. For the reason above, we limited the analysis to current research of PP in contrast to Casper et al. (2007) who analysed articles from 1980 to 2003. For PP, 196 articles with 250 studies (except for one editorial and commentary) were published in both journals. For EP, 145 articles with 187 studies (except for corrected articles and commentaries) were published in both journals. Table 1 gives an overview. A list of all included articles for both areas is available in supplementary online material, Tables 1 to 4, on pages 13-31.

Coding Process

To evaluate the research methods, a review was conducted using a category system including the dimensions based on our considerations and the study of Casper et al. (2007). The dimensions were subdivided into further categories to analyse the studies.

We adapted our category system to our research questions by excluding the dimensions level of analysis, triangulation, measurement of variables, and research content area, and modified the dimensions research design, sample characteristics, data collection methods, and techniques to analyse data, and added the dimension constructs and instruments. The following dimensions were included:

Study Design. We decided that the first step for all studies was to categorize them by their general study design. The categories were theoretical articles (including reviews), meta-analyses, qualitative studies, and empirical studies (including interventional studies).

The remaining steps corresponded to Casper et al. (2007). All empirical studies were divided and categorized by their level of control and thus included experiments, quasi-experimental studies,

Table 2

Frequencies of the individual categories for the general study design for both journals of each area

	Positive Psychology		Educational Psychology	
Study design	**Frequency**	**%**	**Frequency**	**%**
Empirical study	218	87.20	173	92.51
Theoretical article	14	5.60	6	3.21
Review	10	4.00	4	2.14
Meta-analysis	7	2.80	4	2.14
Qualitative Study	11	4.40	4	2.14
Overall	250		187	

Note. Percentages are rounded to two decimal places.

Table 3

Frequencies of the individual categories for the empirical studies (including interventional studies) in the dimension study design for both journals of each area

	Positive Psychology		Educational Psychology	
	Frequency	**%**	**Frequency**	**%**
Empirical Study	**218**		**173**	
Level of Control	**218**		**173**	
Experimental	56	25.68	107	61.85
Quasi-experimental	21	9.63	11	6.36
Correlational	141	64.69	55	31.79
Time Horizon	**218**		**173**	
Cross-Sectional	139	63.76	108	62.43
Longitudinal	79	36.24	65	35.57
Environment	**218**		**173**	
Laboratory	40	18.35	51	29.48
Field	178	81.65	122	70.52

Note. Percentages are rounded to two decimal places.

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Table 4

Frequencies of the data collection methods used in the both journals for each area

	Positive Psychology		Educational Psychology	
Data collection methods	**Frequency**	**%**	**Frequency**	**%**
Measures	**295**		**292**	
Self-report	208	95.41	126	72.83
Tests	9	4.13	98	56.65
Rating	33	15.14	-	-
Interview	12	5.50	18	10.40
Observation	2	0.92	16	9.25
External Assessment	6	2.75	15	8.67
Diary	9	4.13	-	-
Reaction Times	3	1.38	7	4.05
Physiological Measures	4	1.83	6	3.47
Archival Material	3	1.38	4	2.31
Event-Sampling	4	1.83	2	1.16
Focus Groups	2	0.92	-	-

Note. Percentages are rounded to two decimal places. Since some studies used more than one data collection method, the overall number of measures is higher than the overall number of studies and percentages do not add up to 100%. For Positive Psychology, 218 studies included data collection methods (qualitative studies, meta-analyses and theoretical articles were previously excluded from the rating). For Educational Psychology that led to 173 studies.

and correlational studies. The only difference was that qualitative studies were treated as a separate category. Empirical studies were then further categorized by the environment (laboratory vs. field) and time horizon (cross-sectional vs. longitudinal). Cross-sectional studies were defined as studies with only one point of measurement while in a longitudinal study, the sample is examined two or more times.

Sample characteristics. The sample was categorized by its size, and – like in the study by Casper et al. (2007) – the participants' gender, occupation, socioeconomic status (e.g. education), and ethnicity or culture. We excluded the analysis of marital status, information about participants' children (e.g. age, average number), and hours worked, but added manner of recruitment, incentives, and the investigation of convenience or clinical sample for judging the representativeness and the generalizability of the results.

Data collection methods. Methods were distributed into the questionnaire, interview, focus group, behavioural observation, diary, archive material and – added to the categories of Casper et al. (2007) – event-sampling, reaction time, physiological measure, external assessment, and others.

Constructs and instruments. The constructs which were measured and the instruments which were used in studies belonging to PP were condensed to provide an overview. For EP, this was omitted since its research questions are not comparable to those of PP.

Techniques to analyse data. With respect to the classification of techniques for analysing data according to Hair, Black, Babin, Anderson, and Tatham (1998) and Casper et al. (2007) and taking into account our considerations, the following classifications were made: simple inferential statistics (t-tests, correlations, chi-

square tests, testing of assumptions, effect sizes, linear regressions, ANOVAs, ANCOVAs), complex statistics (hierarchical linear modelling, multiple regressions, logistic regressions, mediation analysis, moderator analysis, mixed linear models, structural equation modelling, path analysis, hierarchical multivariate regressions, MANOVAs, MANCOVAs), data structure (confirmatory factor analysis, multiple factor analysis, exploratory factor analysis, latent profile analysis, cluster analysis), qualitative analysis (content analysis, thematic analysis).

Interrater Reliability

All articles were analysed by one rater. Thereafter, about ten percent randomly selected were analysed by a second rater to judge the reliability of the coding. For the few cases in which the interrater reliability achieved results below .70, the two raters discussed the disagreements and then revised rating independently of each other. Cohen's Kappa was calculated and yielded results between .70 and .98 (M=.86) which is a moderate to almost perfect reliability (on average strong) according to McHugh (2012).

Analyses of Similarities and Differences between Journals

Differences of the frequency of categories between the journals of PP and EP were calculated using chi-square tests with a significance level of α=0.05.

RESULTS

Multiple studies

We analysed whether the articles contained multiple studies as this can be considered a quality feature. Observed in less than 20% of the articles in both areas, there was no significant difference in frequency.

Study design: level of control, measurement points, environment

For both journals in each area, Table 2 provides an overview of the frequencies of individual categories for the general study design. Overall, the general study design for both PP and EP showed that most were empirical studies (PP=87.20%, EP=92.51%). Theoretical articles, meta-analyses, and qualitative studies were respectively found less than 5% in both areas.

To further elucidate the empirical studies, Table 3 provides an overview. For level of control, 61.85% of EP studies were experimental and only 31.79% correlative. For PP, however, only 25.68% of the studies were experimental, but 64.69% were correlative. Chi-square tests determined that the proportion of experiments between PP and EP differed significantly, $\chi^2(1, N=391)=51.89$, $p<.001$, and the proportion of the correlative studies between PP and EP differed significantly too, $\chi^2(1, N=391)=41.73$, $p<.001$. The use of cross-sectional and longitudinal studies was approximately equally distributed between the areas. Studies of EP were conducted in laboratory in 29.48% of all the cases. For PP, this was true for only 18.35%. The chi-square test determined that the proportion of laboratory and field experiments between PP and EP differed significantly, $\chi^2(1, N=391)=6.69$, $p<.01$.

Sample Characteristics

The analysis of the sample sizes revealed that the results were comparable for both areas. In addition, the analysis of the sample characteristics showed that most of the participants were university students (PP=40.43%, EP=35.60%). However, for EP, many participants included school pupils. The analysis of ways of recruitment showed that for both areas, most participants joined as part of their studies requirement (PP=21.30%, EP=24.08%). Furthermore, 30.37% of EP studies lacked information on recruitment, compared to 12.61% of PP studies. As incentives, most participants received some kind of certificate for their studies (PP=22.17%, EP=18.32%). Also, 55.65% of PP and 61.26% of EP studies did not include information about incentives.

Almost all studies were conducted on non-clinical samples. Only 3.04% of PP studies used clinical samples, none of the EP studies did.

Due to criticism that many studies of PP focus on individualistic cultures, the average ethnic descent was analysed. Note that for PP 56.95% and for EP 67.02% of the studies did not contain any information about ethnic descent. For studies that included information, 63.49% of the subjects from PP were of Caucasian origin. For EP, this was true for only 42.61%.

The socioeconomic status of the subjects was also considered, but studies of both areas contained no or incomparable and vague information.

Data collection methods

PP is often criticized for mostly using self-assessment measures (Cromby, 2011; McNulty & Fincham, 2011; Wong, 2017). Therefore, Table 4 compares the data collection methods of PP and EP. It is striking that 95.41% of PP studies included self-assessment measures, which was 72.83% for EP. The chi-square test determined that the proportion of studies including self-reports between PP and EP differed significantly, $\chi^2(1, N=391)=39.49$, $p<.001$. Tests were

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Table 5

Frequencies of the constructs measured in the journals for Positive Psychology and exemplary scales that were frequently used for measurement

Constructs measured	Frequency	%	Scales
Well-being	81	10.10	SWLS, PWB
Satisfaction	79	9.85	SWLS, MSLSS
Affect, Mood	62	7.73	PANAS
(Mental-)Health	54	6.73	SCID, BDI-II, BSI, SRH
Happiness	42	5.24	SWLS, SHS
Work	40	4.99	-
Personality	37	4.61	Big-Five, HEXACO, NCS
Religiosity, Spirituality	33	4.11	-
Strengths	16	2.00	VIA
Self	32	3.99	RSE
Meaning in Life	31	3.87	MLQ, WAS
Social-Support	30	3.74	MFQ
Cognition	15	1.87	-
Gratitude	11	1.37	GRAT
Family	15	1.87	PCPR
Other	224	27.93	-
Overall	**802**		

Note. Since most studies measured more than one construct, the overall frequency of the constructs does not correspond to the number of studies. Percentages are rounded to two decimal places and calculated in relation to the overall number of measured constructs

BDI-II: Beck Depression-Inventory-II (Beck, Steer, & Brown, 1996), Big Five (Goldberg, 1992), BSI: Brief Symptom Inventory (Derogatis & Spencer, 1993), GRAT: Gratitude, Resentment and Appreciation Test (Diessner & Lewis, 2007), HEXACO: HEXACO Personality Inventory (Lee & Ashton, 2004), MFQ: Mood and Feelings Questionnaire (Angold & Costello, 1987), MLQ: Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006), MSLSS: Multidimensional Students' Life Satisfaction Scale (Huebner & Gilman, 2002), NCS: National Comorbidity Survey (Kessler & Merikangas, 2004), PANAS: Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988), PCPR: Parental Conditional Positive Regard (Assor, Roth, Israeli, Freed, & Deci, 2007), PWB: Psychological Well-Being (Ryff, 1989), SCID: Structured Clinical Interview for DSM-IV axis (Gibbon, Spitzer, Williams, Benjamin, & First, 1997), RSE: Rosenberg Self-Esteem Scale (Rosenberg, 1965), SHS: Subjective Happiness Scale (Shimai, Otake, Utsuki, Ikemi, & Lyubomirsky, 2004), SWLS: Satisfaction With Life Scale (Diener, Emmson, Larsen, & Griffin, 1985), VIA: Values in Action (Peterson & Seligman, 2006), WAS: World Assumption Scale (Janoff-Bulman, 1985).

used in 56.65% of the EP studies, in PP only 4.13% of the studies did. Again, the chi-square test determined that the proportion of studies including tests between PP and EP differed significantly, $\chi^2(1, N=391)=133.85$, $p<.001$.

Constructs and instruments

Table 5 provides an overview of the constructs and instruments most frequently used in PP. Constructs measured in PP range from well-being, life satisfaction, mood/affect, or happiness to personality, or meaning in life. Despite the criticism of exclusively focusing on the positive, it was found that some 'negative constructs' have also been measured. This dimension is not only applicable in terms of mental health, but also constructs like social support or family-related constructs can be consulted, e.g. aspects of violence, loneliness, or exclusion.

Techniques to analyse data

To compare the techniques for analysing data between both areas, Table 6 provides an overview. For both areas, it was shown that the most commonly used methods were the simple inferential statistics (PP=67.92%, EP=69.95%).

By comparing the results for the respective categories, similarities were observed in both areas: complex techniques (PP=24.68%, EP=23.14%), analyses of data structure (PP=6.10%, EP=5.01%), and qualitative analyses (PP=1.30%, EP=1.90%).

DISCUSSION

Firstly, we will summarize the results with respect to our research questions by presenting the similarities and differences between PP and EP. Then, we will outline additional recommendations from our research and finally, discuss the limitations and summarize our results.

Summary regarding research questions

Similarities between PP and EP. Results showed that for five out of the eight research questions there were no differences between PP and EP: in the proportion of articles including multiple studies, empirical studies, longitudinal studies, student samples and complex statistical analyses used. Therefore, the results of most research questions support that the status of PP is similar to EP. Since the status of EP is well established, its results can be used as a required standard. If on the one hand, showing similar results for less than half of the research questions would have been a poor result, and on the other hand, showing similar results for all research questions would have been an excellent result, the status of PP can be estimated as good.

Differences between PP and EP. Considering the criticism (Cromby, 2011; Wong, 2017), differences were identified for the proportion of experiments, laboratory studies and the application of self-report measures.

However, some differences in the research methods between PP and EP do not indicate any deficits in PP but emerge due to the different strategies needed by different contents. For example, learning as an essential part of EP can be easily studied in a laboratory experiment using objective measures like eye movement or number of correctly learned words (Berliner & Calfee, 2004) but for PP, constructs like well-being can be studied more effectively in real world settings using self-report measures (Parks & Biswas-Diener, 2013) whereas using experiments is more difficult.

Additional recommendations ordered by categories

Study design. Most studies in PP and EP are experimental. This means that research is focussing on new results instead of only referring to already published literature like reviews do.

Most studies of PP are based on a cross-sectional study design. The main disadvantage of such studies is that they do not provide information on intraindividual differences, whereas longitudinal studies allow investigating individual changes over time (McNulty & Fincham, 2011). Although the proportion of longitudinal studies in PP is comparable with that of EP, it is recommended to use longitudinal study designs more often in PP. This is especially important for investigating the development of positive constructs and long-term efficacy of PP interventions.

Most studies in PP and EP are carried out in a natural setting. The proportion of laboratory studies is significantly smaller in PP compared with EP. Regarding the level of control, correlational studies are the most frequent category in PP. In EP, the proportion of experimental studies is significantly greater in contrast to PP. Therefore, it might be considered – if appropriate – to carry out more experiments and to perform more laboratory studies in PP. Nevertheless, the feasibility of this proposal for PP must be examined critically. For each case, it should be examined whether experimental manipulation is possible. Although it might be adequate to study PP in field studies, the more frequent use of laboratory settings could also be considered.

Sample characteristics. Most studies in PP and EP were carried out based on student samples extrinsically motivated by

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Table 6

Frequencies for the category techniques for analysing data for both journals of each area.

	Positive Psychology		Educational Psychology	
	Frequency	**%**	**Frequency**	**%**
Overall	**770**		**579**	
Simple inferential statistics	**523**	**67.92**	**405**	**69.95**
Complex techniques	**190**	**24.68**	**134**	**23.14**
HLM	38	4.94	23	3.97
Multiple regression	32	4.15	21	3.62
Logistic regression	10	1.30	15	2.59
Mediation analysis	31	4.02	15	2.59
Moderator analysis	10	1.30	6	1.04
Mixed linear models	6	0.78	2	0.34
Structural equation modelling	22	2.86	18	3.11
Path analysis	14	1.82	7	1.21
Hierarchical multivariate regression	12	1.56	3	0.52
MANOVA	11	1.43	13	2.25
MANCOVA	4	0.52	11	1.90
Data structure	**47**	**6.10**	**29**	**5.01**
CFA	26	3.37	17	2.95
MFA	1	0.13	2	0.34
EFA	15	1.95	4	0.69
Latent profile analysis	-	-	4	0.69
Cluster analysis	5	0.65	2	0.34
Qualitative analysis	**10**	**1.30**	**11**	**1.90**
Content analysis	10	1.30	10	1.73
Thematic analysis	-	-	1	0.17

Note. Since all studies used more than one statistical analysis, the overall frequency of the techniques does not correspond to the number of studies. Percentages were rounded to two decimal places and calculated in relation to the overall number of statistical analyses. Simple inferential statistics included t-tests, correlations, chi-squared tests, testing of assumptions, effect sizes, linear regressions, ANOVAs and ANCOVAs.

requirements for courses. The quality and reliability of such results are disputable (Peterson, 2001). Furthermore, student responses are likely to be more homogeneous compared to responses of other participant groups. For this reason, we recommend repeating the examinations with more representative samples avoiding convenience samples for increasing the generalizability of results.

In addition, according to guidelines of the American Psychological Association (2009), information on recruitment and type of incentives should always be provided, which if lacking, this information can be criticized methodically.

Most studies in PP and EP can be criticized on basis of being conducted with Caucasian samples. The generalizability across cultures of such results is questionable (Wong, 2017). However, this result must be treated with caution because most studies did not provide information about the ethnicity of the sample. Therefore, the mere inclusion of information about ethnicity is recommended.

Data collection methods. We aimed to provide information about the data collection methods used in the area of PP. Most methods used in PP are self-report measures, and the number of studies with objective measurements is rather small. The reason for this can be that most topics of PP require self-reflection and self-reporting. Nevertheless, it could be advantageous for future research to use more diverse and complex methods provided sufficiently in the Oxford Handbook of Methods of Positive Psychology (Ong & Van Dulmen, 2006). Finally, one should keep in mind that the methods used should always be considered in the context of the research questions. As a result, the high proportion of self-report measures can therefore be justified since it is even more important for PP to ensure the quality of data collection methods used.

Techniques to analyse data. In PP and EP, most of the studies used simple inferential statistics to analyse the data. Comparatively few studies were based on more complex statistical methods. Depth and complexity of the statistical methods also contribute to the quality of the research (Tabachnick & Fidell, 2013). Therefore, the techniques for analysing data should be improved.

Limitations

Our study has several limitations. First, this study summarizes and analyses the methods applied in research of a limited time of three years, from 2015 to 2017. Therefore, studying developmental changes is difficult. As already mentioned, we wanted to prioritize the actuality of the articles since PP itself has developed beyond its early scope (Warren et al., 2017). Second, we did not use any search of PP terms to select articles for analysis. It was decided to choose important and influential journals in the area of PP for two reasons: One the one hand, searching for PP terms yielded thousands of hits because many terms are related to PP. On the other hand, clearly separating PP articles from other articles is difficult since most PP terms (e.g. "love") could also lead to popular books and novels or articles dealing with the absence of the term searched. For each hit, a decision whether it is a PP article or not would have been needed. Therefore, we only considered articles in PP journals from which the editors made this choice to reduce this uncertainty. Third, the comparison group is limited to EP instead of involving various established areas of psychology. As argued earlier, EP is the area most similar to PP. Therefore, comparing the research methods of PP with EP is more useful than with other areas of psychology. Fourth, we focused on the categories that can be measured easily and pretty accurate. Theoretically, analysing fit of the research methods and methods of data analyses with research questions is of great interest but would require a more subjective and interpretative approach. Collectively, these methodological choices were made to derive helpful implications for future research.

Conclusion

In order to evaluate the quality of the research methods and to investigate whether the methodological criticisms regarding PP (Cromby, 2011; McNulty & Fincham, 2011; Wong, 2017) are justified, this study gives an overview of the methods used in PP. It reveals how often different research study designs, data collection methods, and statistical techniques are applied and provides information about the samples on which investigations in this area are based. In addition, the methods of PP are compared with those in the area of EP. Overall the results are quite positive for the methodological state of research in PP, and some suggestions for improvement were also recommended. The high proportion of self-report measures criticized was confirmed. Other points of methodological issues (e.g. the high proportion of student samples or the low complexity of statistical analysis) were evident not only in PP, but also in the already established area of EP. Nevertheless, it is recommended to improve the quality of PP studies to help it grow methodologically and as a result, become a more independent area of psychology. This can be done by conducting more longitudinal studies and experiments, recruiting representative groups of people for participation, as well as by using more complex techniques to analyse data. The focus on self-report measures is useful in given topics and specific constructs of PP, but more complex or objective data collection methods should

European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

also be considered wherever possible. Additionally, the manner of recruitment, incentives for the participants, and information about ethnicity should be contained in future studies.

In sum, the methodological quality of PP is already good. This is of great importance and will enhance PP as a rather new research area to become more established. ■

Citation

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European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

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European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

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European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

Table 2

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European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

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Table 3

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European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

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European Journal of Applied Positive Psychology 2020, 4, Article 2 ISSN 2397-7116

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