



ADAPTION AND PSYCHOMETRIC PROPERTIES OF THE SHORT FORMS MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE WITH A SAMPLE OF GREEK UNIVERSITY STUDENTS

Konstantinos Lavidas¹ⁱ,

Vasilios Gialamas²

¹Department of Educational Sciences &
Early Childhood Education,
University of Patras,
Greece

²Department of Early Childhood Education,
National and Kapodistrian University of Athens,
Greece

Abstract:

Nowadays more and more self-report measures are used in social psychology, where many of them are susceptible to response biases. Socially Desirable Responding (SDR) might be interpreted in terms of response biases. The present study, with a sample of 173 Greek university students, used confirmatory factor analysis to establish the adequacy of Reynolds (1982) three forms from the original 33 item version of Crowne & Marlowe (1960) in measuring social desirability. Results showed that the three short forms of social desirability scale provide satisfactory measures of social desirability, while the form with the smaller number of items presented improved measures in comparison to all other forms.

Keywords: social desirability scale, response bias, self-reports, higher education, confirmatory factor analysis

1. Introduction

Socially Desirable Responding (SDR) might be interpreted in terms of measurement bias (Podsakoff et al., 2003). In particular the SDR is defined as the tendency of survey respondents to report themselves in the best possible light, giving answers that are perceived as socially desired and acceptable (Crowne & Marlowe, 1960; Reynolds, 1982; Tourangeau & Yan, 2007). This tendency to answer in a way that will be viewed favorably may lead to inaccurate self-reports and, ultimately, erroneous study conclusions, so data are systematically biased (McCrae and Costa, 1983; Podsakoff et al.,

ⁱ Correspondence: email lavidas@upatras.gr

2003). Attempts to detect SDR bias have mainly focused on surveys that have been carried out in sensitive topics, such as health, sexual and drug-related behaviors (Podsakoff et al., 2003; Krumpal, 2013; Tourangeau & Yan, 2017). However, the frequent use of self-report surveys in higher education calls into question the possibility of Social Desirability not having an unwanted influence on responses on topics of less sensitive nature (Bowman & Hill, 2011). Recent studies on a broad spectrum of topics in higher education have found relationships between SDR and variables of interest (Kelly et al., 2017; Miller, 2012; Bowman & Hill, 2011; Nauta, 2007). The extent to which self-reporting tools contain social desirability bias needs to be measured in order to assess the validity of the findings (Podsakoff et al., 2003).

The Marlowe-Crowne Social Desirability Scale (MC-SDS) (Crowne & Marlowe, 1960) was developed to measure the social desirability response biases and is the most widely used inventory with nonpathological subjects (Beretvas, Meyers & Leite, 2002; Steenkamp, De Jong & Baumgartner, 2010). These 33 true-false items constitute a very long scale, which is mainly utilized with various self-report instruments, and transcribes culturally approved behaviors with a low probability of occurrence. 18 of these items are considered attribution and the remaining 15 items are considered denial items (Beretvas et al., 2002). For each attribution item the true response will score one point, since this response indicates a stronger tendency of the respondent in a socially desirable way than someone who responded false. For example, the item “13. *No matter who I'm talking to, I'm always a good listener*” (Crowne & Marlowe, 1960). On the other hand, for each denial items a false response will score one point. These items refer to socially disapproved but common behaviors. For example, the item “19. *I sometimes try to get even rather than forgive and forget.*” (Crowne & Marlowe, 1960).

Researchers (e.g., Reynolds, (1982) and Strahan and Gerbasi, (1973)) tried to decrease the long 33 item scale MC-SDS and developed various short forms. The three most commonly used short forms were developed by Reynolds (1982). Many researchers studied them, aiming to find out the better form for use (Reynolds, 1982; Fischer & Fick, 1993; Loo and Thorpe, 2000). However, the previous studies never administered the short forms separately, but they analyzed them as subsets of the 33 item full scale. This procedure has no control on idiosyncrasies of the items pool or for response differences that may occur when researchers administer the short forms (Zook & Sipps, 1985). The present study will try to answer this problem and simultaneously to adapt these short forms for Greek respondents since, to the authors' knowledge, the current study is the first one attempting to adapt and validate these short forms.

2. Social Desirability Scale Reynolds' Short Forms

Reynolds (1982) administered the 33 items Social Desirability Scale (SDS) to 608 undergraduate students from a medium sized state university of the USA. He used principal component analysis to develop short subscales of the original inventory. These three forms have 11, 12 and 13 items respectively, the same as those of the original scale (Crowne & Marlowe, 1960), while 11 items are common for all 3 forms.

From the 13 items five of them (13, 16, 21, 26 and 33) are considered attribution items and the remaining items (3, 6, 10, 12, 15, 19, 28 and 30) are considered denial items (Beretvas et al., 2002). All forms demonstrated acceptable level of reliability since, Kuder-Richardson formula 20 ranged from .74 to .76. Each of the 3 forms, called A, B, and C respectively and the last one, had better psychometrical properties than others. Indeed, this form was found to have acceptable to satisfactory psychometric properties with reliability indices from .62 to .76 (Loo & Thorpe, 2000; Reynolds, 1982; Zook & Sipps, 1985; Sârbescu, Costea and Rusu, 2012) and six-week test–retest product moment correlation of .74 (Zook & Sipps, 1985).

These forms A, B and C have been investigated from various researchers (for example Fischer & Fick, 1993; Loo and Thorpe, 2000, Zook & Sipps, 1985; Sârbescu et al., 2012). Zook and Sipps (1985) used three student populations from Psychology Departments, who completed the 13-items form of Reynolds (1982) MC-SDS and at least one other self-report measure. According to them the form C can be used instead of the full scale without significant loss of reliability. Fischer and Fick (1993) administered the 33 items SDS to 390 undergraduate introductory psychology students at a mid-western Canadian university. The researchers used confirmatory factor analyses to evaluate the adequacy of the full scale and the Reynolds' forms. They found that forms A and B were an improvement over form C. Loo and Thorpe (2000), used confirmatory factor analyses to evaluate the adequacy of the full scale and the Reynolds' short forms. Their results from 232 Canadian undergraduate students, from five management and four nursing classes at a small liberal education university in western Canada, demonstrated that all the forms were a significant improvement in fit over the 33-item full scale and that the Reynolds' (1982) forms A and B were the best fitting short versions. Finally, Sârbescu, Costea and Rusu (2012) used confirmatory factor analyses to investigate the psychometric properties and the reliability of the Romanian version of the Marlowe-Crowne Social Desirability Scale, as well as the fit of two short forms of the scale with a sample of 215 students. They supported that the C short form is the most adequate and it presents a satisfactory reliability (Cronbach's alpha .75).

3. Research Objectives of the Study

The aim of this research is twofold, a) to adapt the short forms of Reynolds (1982) to Greek university students and b) to suggest which form of Reynolds (1982) provides the best measure of social desirability.

4. Method

4.1 Research Instrument Translation and Adaptation

To measure Social Desirability bias, the 13-items short version (Reynolds, 1982) of the Marlowe Crowne Social Desirability (MCSD) scale was used. Respondents were asked to report whether a statement was true or false for themselves. "True" responses to

items 13, 16, 21, 26 and 33, were added to “False” responses to items 3, 6, 10, 12, 15, 19, 28 and 30, to calculate the total score (see Appendix).

The 13 items (Reynolds, 1982) of the MCSD were translated into Greek language using back-translation method. Four independent translators were involved in the process. All translators were post-graduate degree holders and all of them were fluent in both English and Greek. Two of them translated the items of the English version producing a final unified Greek version. Then the remaining two translators [back] translated the Greek version of the scale back to English. Afterwards we checked the original version of the 13 items and its back-translated version and minimum modifications were made to the Greek (see Appendix the final Greek form).

Before the final administration of the tool, the questionnaire was given to four university students that were excluded from the final sample in order to track and resolve any problems that could come up while conducting the study. Discussion with the subjects did not bring out any wording issues that had to be faced. Finally, in order to test the stability of MC-SDS short forms with 13-items (Reynolds, 1982) a test retest procedure was followed. The 13 items were administered twice in two weeks period in a similar sample of 25 university students who were excluded from the final sample. The Pearson product moment correlation coefficient for total score was statistically significant and high for each form ($r_A=.71$, $r_B=.67$, $r_C=.66$).

4.2 Research Procedure and Participants

The research was conducted in September and October 2019. A total of 173 undergraduate students participated voluntarily in a paper-based survey, 141 females and 32 males: with age range 20-25, from the University of Patras and two departments, a) Philosophy (43.4%) and b) Early Childhood Education (56.6%). In a brief introduction, students were informed that answering sincerely was important for the survey results and they were assured that the survey was anonymous. The participants answered all the questions and there was no missing data.

4.3 Strategy of Data Analysis

The appropriateness of the various short forms was evaluated through Confirmatory Factor Analysis (CFA) using R (R Core Team, 2018) and the Lavaan’s package (Rosseel, 2012). The estimator used was Diagonally Weighted Least Squares (DWLS), which is a robust estimator that does not assume normally distributed variables and moreover, it offers better estimations for modelling categorical or ordered data (Míndrilă, 2010; Li, 2016). Fit indices used to accept the factorial structure were chi-square, relative fit indices such as, Tucker Lewis index (TLI), noncentrality-based indices such as, Comparative fit index (CFI) and Root mean square error of approximation (RMSEA). Statistically non-significant chi-square and values of CFI and TLI over 0.95 and RMSEA under 0.08 imply a very satisfactory fit (Hu, & Bentler, 1999). Additionally, the Akaike information criterion (AIC) was used as measure, which favors parsimonious models. Finally, the final factorial structure was checked regarding its construct validity as well

as its reliability. Details on the aforementioned psychometric properties are discussed in the Results section.

5. Results

Table 1 presents the responses of university students in all 13 statements. The majority of students answered true in four of five attribution items and false in four of the eight denial items.

Table 1: Responses' distribution of students (N=173)

| Items | False | True |
|--|-------|-------|
| 3. It is sometimes hard for me to go on with my work if I am not encouraged. | 27.2% | 72.8% |
| 6. I sometimes feel resentful when I don't get my way. | 45.7% | 54.3% |
| 10. On a few occasions, I have given up doing something because I thought too little of my ability. | 34.1% | 65.9% |
| 12. There have been times when I felt like rebelling against people in authority even though I knew they were right. | 59.5% | 40.5% |
| 13. No matter who I'm talking to, I'm always a good listener. | 31.2% | 68.8% |
| 15. There have been occasions when I took advantage of someone. | 64.2% | 35.8% |
| 16. I'm always willing to admit it when I make a mistake. | 39.3% | 60.7% |
| 19. I sometimes try to get even rather than forgive and forget. | 65.9% | 34.1% |
| 21. I am always courteous, even to people who are disagreeable. | 34.7% | 65.3% |
| 26. I have never been irked when people expressed ideas very different from my own. | 61.3% | 38.7% |
| 28. There have been times when I was quite jealous of the good fortune of others. | 30.1% | 69.9% |
| 30. I am sometimes irritated by people who ask favors of me. | 52.6% | 47.4% |
| 33. I have never deliberately said something that hurt someone's feelings. | 46.8% | 53.2% |

Note: English version of 13-items (Reynolds, 1982). The numbers are the original numbers of the 33-items Marlowe-Crowne Social Desirability Scale (MC-SDS) (Crowne & Marlowe, 1960).

For the 11, 12 and 13 item forms of MCSDS, all indices resulting from the confirmatory factor analysis except chi-square showed optimal or acceptable values (see Table 2). However, Chi-square is not a very good fit index, because larger samples produce larger chi-squares that are more likely to be significant (Hu, & Bentler, 1999). The two short forms A and B seem to present the best fit in comparison to form C. However, the form A has a lower AIC than the other forms, indicating that it is the preferred structure (Burnham & Anderson, 2004).

Table 2: Fit indices for the one-dimension structure of three forms

| | χ^2 | df | χ^2/df | TLI | CFI | RMSEA | CI (RMSEA) | AIC |
|--------|----------|----|-------------|------|------|-------|------------|---------|
| Form A | 74.92 | 44 | 1.702 | .958 | .966 | .064 | .038-.088 | 168.920 |
| Form B | 98.27 | 54 | 1.819 | .948 | .958 | .069 | .047-.090 | 172.273 |
| Form C | 122.67 | 65 | 1.887 | .937 | .947 | .072 | .052-.091 | 174.673 |

Note: Form A items: 3,6,13,15,16,19,21,26,28,30,33.

Form B items:3, 6, 12, 13, 15, 16, 19, 21, 26, 28, 30, 33.

Form C items:3,6,10,12,13,15,16,19,21,26,28,30,33.

df = degrees of freedom; NFI = Normed Fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; AIC = Akaike information criterion.

In the final one-factor factorial structure (see Table 3) all item loadings were significant, and their standardized values ranged from .212 to .894. Moreover, differences were not observed among the loadings of items among forms.

Table 3: Statistically significant loadings at .05 level for each form

| Items | Loadings | | |
|-------|----------|--------|--------|
| | Form A | Form B | Form C |
| 3* | .389 | .393 | .431 |
| 6* | .518 | .517 | .507 |
| 10* | - | - | .323 |
| 12* | - | .554 | .561 |
| 13 | .791 | .756 | .758 |
| 15* | .764 | .734 | .738 |
| 16 | .685 | .732 | .730 |
| 19* | .682 | .695 | .685 |
| 21 | .388 | .389 | .370 |
| 26 | .717 | .711 | .709 |
| 28* | .865 | .889 | .894 |
| 30* | .216 | .212 | .218 |
| 33 | .718 | .708 | .700 |

Note: * these items have been reversed.

As shown in Table 4, Cronbach's alpha coefficients at least .7 indicate satisfactory reliability for each form (Cronbach 1951). Moreover, the indices AVE are close to .5 for each form, indicating marginally satisfactory construct validity. Finally, the independent samples t-test did not reveal that the social desirability total score in each form was significant different between male and female ($p > .05$).

Table 4: Mean, standard deviation, Cronbach's Alpha and Average Variance Extracted (AVE)

| | Female (N= 141) | | | Male (N=32) | | | Total (N=173) | | | |
|--------|-----------------|------|----------|-------------|------|----------|---------------|------|----------|------|
| | M | SD | α | M | SD | α | M | SD | α | AVE |
| Form A | 5.73 | 2.90 | .768 | 5.68 | 2.63 | .693 | 5.72 | 2.84 | .755 | .412 |
| Form B | 6.36 | 3.11 | .763 | 6.25 | 2.82 | .692 | 6.31 | 3.06 | .767 | .404 |
| Form C | 6.72 | 3.25 | .776 | 6.36 | 2.94 | .708 | 6.66 | 3.19 | .764 | .381 |

Note: α =Cronbach's alpha

6. Discussion of Results

The aim of this research was to adapt the short forms of Reynolds (1982) to Greek respondents and simultaneously to suggest which form of Reynolds (1982) provides the best measure of social desirability. Initially, the test-rest reliability analysis showed that all Reynolds' forms (1982) of MC-SDS present satisfactory stability in the two-week period (Zook & Sipps, 1985). Moreover, all three short versions achieved fit (Loo & Thorpe, 2000), while the form A with 11 items achieved optimal fit (Fischer and Fick, 1993; Loo and Thorpe, 2000). Finally, in all forms the coefficients Cronbach's Alpha indicate satisfactory reliability (Loo & Thorpe, 2000; Reynolds, 1982; Sârbescu et al.,

2012) and marginally convergent validity. Finally, no significant gender differences were found in university students' social desirability total scores for each form (Zook and Sipps, 1985; Loo & Thorpe, 2000).

The present research has one major limitation, that the majority of participants were female. Although gender differences were not revealed on social desirability, future research is suggested to investigate measurement invariance of forms among various groups.

In conclusion, this research showed that the short forms of Reynolds (1982) are reliable instruments, when administered to Greek University students. Also, the 11-item short form (A) with the best fit, seems to be more adequate for the measurement of social desirability in comparison to the other two short forms. So, in future research, this form could be applied to the Greek population recovering the measurement of social desirability since it requires less administration time.

6.1 Recommendations

When SD form is applied, the potential contamination should initially be assessed by the correlation between the SD total score and the scale of interest. If no significant correlation is found or the correlation is negligible, i.e., less than $|0.2|$, then the variables measured are probably not influenced by SDR. If the correlation is non-negligible, this is an indication of a possible contamination, in which case it is important to check whether SDR influences the basic correlation between the independent and dependent variables of interest (Steenkamp et al., 2010; Miller, 2012).

Conflict of Interest

There is no conflict of interest among the authors of this study.

References

- Beretvas, N. S., Meyers, J. L., & Leite, W. L. (2002). A reliability generalization study of the Marlowe-Crowne social desirability scale. *Educational and Psychological Measurement*, 4, 570–589. <https://journals.sagepub.com/doi/abs/10.1177/0013164402062004003>
- Bowman, N. A., & Hill, P. L. (2011). Measuring How College Affects Students: Social Desirability and Other Potential Biases in College Student Self-Reported Gains, (150), 73–85. <https://doi.org/10.1002/ir>
- Burnham, K. P., & Anderson, D. R. (2004). Multimodel inference: understanding AIC and BIC in model selection. *Sociological methods & research*, 33(2), 261-304.
- Cronbach L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*. 16(3): 297–334. [doi:10.1007/bf02310555](https://doi.org/10.1007/bf02310555).
- Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of consulting psychology*, 24(4), 349.

- Fischer, D. G., & Fick, C. (1993). Measuring social desirability: Short forms of the Marlowe-Crowne social desirability scale. *Educational and Psychological Measurement*, 53(2), 417-424. Doi: 10.1177/0013164493053002011
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.
- Kelly, N., Harpel, T., Fontes, A., Walters, C., & Murphy, J. (2017). An examination of social desirability bias in measures of college students' financial behavior. *College Student Journal*, 51(1), 115-128.
- Krumpal I., (2013) Determinants of Social Desirability Bias in Sensitive Surveys: A Literature Review. *Qual Quant* 47(4), 2025-2047. <https://doi.org/10.1007/s11135-011-9640-9>
- Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, 48(3), 936–949. <https://doi.org/10.3758/s13428-015-0619-7>
- Loo, R., & Thorpe, K. (2000). Confirmatory Factor Analyses of the Full and Short Versions of the Marlowe-Crowne Social Desirability Scale. *The Journal of Social Psychology*.140(5), 628-635, Doi: 10.1080/00224540009600503
- McCrae, R. R., & Costa, P. T. (1983). Social desirability scales: More substance than style. *Journal of consulting and clinical psychology*, 51(6), 882-888.
- Miller, A. L. (2012). Investigating social desirability bias in student self-report surveys. *Educational Research Quarterly*, 36(1), 30–47.
- Mîndrilă, D. (2010). Maximum Likelihood (ML) and Diagonally Weighted Least Squares (DWLS) Estimation Procedures: A Comparison of Estimation Bias with Ordinal and Multivariate Non-Normal Data. *International Journal for Digital Society*, 1(1), 60–66. <https://doi.org/10.20533/ijds.2040.2570.2010.0010>
- Nauta M. M. (2007) Assessing College Students' Satisfaction with Their Academic Majors. 15(4), 446-462. <https://doi.org/10.1177/1069072707305762>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. <http://dx.doi.org/10.1037/0021-9010.88.5.879>
- R Core Team (2018). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL. <https://www.R-project.org/>.
- Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of clinical psychology*, 38(1), 119-125.
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–23.1097. *Journal of statistical software*, 48(2), 1-36. <https://doi.org/10.18637/jss.v048.i02>
- Sârbescu, P., Costea, I., & Rusu, S. (2012). Psychometric properties of the Marlowe-Crowne social desirability scale in a Romanian sample. *Procedia-Social and Behavioral Sciences*, 33, 707-711. doi:10.1016/j.sbspro.2012.01.213.

- Steenkamp, J. B. E., De Jong, M. G., & Baumgartner, H. (2010). Socially desirable response tendencies in survey research. *Journal of Marketing Research*, 47(2), 199-214. <https://doi.org/10.1509/jmkr.47.2.199>.
- Strahan, R., & Gerbasi, K. C. (1973). Semantic style variance in personality questionnaires. *The Journal of psychology*, 85(1), 109-118.
- Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological bulletin* 133(5), 859–883. <https://doi.org/10.1037/0033-2909.133.5.859>.
- Zook II, A., & Sippy, G. J. (1985). Cross-validation of a short form of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology*, 41(2), 236-238.

Appendix

Greek version of 13-items (Reynolds, 1982). In the parenthesis there is the original number of 33-items Marlowe-Crowne Social Desirability Scale (MC-SDS) (Crowne & Marlowe, 1960).

Greek Version

- (3)*. Μερικές φορές είναι δύσκολο για μένα να συνεχίσω αυτό που κάνω, αν δεν με ενθαρρύνουν.
- (6)*. Μερικές φορές δυσανασχετώ όταν δεν περνάει το δικό μου.
- (10)*. Σε κάποιες περιπτώσεις, έχω παραιτηθεί από κάποια δραστηριότητα, γιατί πίστευα ότι δεν ήμουν αρκετά ικανός/ή.
- (12)*. Έχουν υπάρξει στιγμές που ένιωσα να επαναστατώ εναντίον ανθρώπων με εξουσία παρόλο που ήξερα ότι είχαν δίκιο.
- (13). Ανεξαρτήτως από το με ποιον μιλάω, είμαι πάντα καλός/η ακροατής/τρια.
- (15)*. Έχουν υπάρξει περιπτώσεις που εκμεταλλεύτηκα κάποιον.
- (16). Είμαι πάντα πρόθυμος/η να το παραδεχτώ όταν κάνω λάθος.
- (19)*. Μερικές φορές προσπαθώ να πάρω εκδίκηση, παρά να συγχωρήσω και να ξεχάσω.
- (21). Είμαι πάντα ευγενικός/η ακόμη και σε ανθρώπους που είναι ενοχλητικοί.
- (26). Ποτέ δεν έχω ενοχληθεί όταν οι άνθρωποι εκφράζουν ιδέες πολύ διαφορετικές από τις δικές μου.
- (28)*. Έχουν υπάρξει στιγμές που ζήλεψα την καλή τύχη άλλων.
- (30)*. Μερικές φορές ενοχλούμαι όταν κάποιος άνθρωπος μου ζητούν χάρες.
- (33). Ποτέ δεν έχω πει εσκεμμένα κάτι που πλήγωσε τα συναισθήματα κάποιου.

Note: Form A items: 3,6,13,15,16,19,21,26,28,30,33.

Form B items: 3, 6, 12, 13, 15, 16, 19, 21, 26, 28, 30, 33.

Form C items: 3,6,10,12,13,15,16,19,21,26,28,30,33.

“True” responses to items 13, 16, 21, 26 and 33, are added to “False” responses to items 3, 6, 10, 12, 15, 19, 28 and 30, to calculate the total score

Creative Commons licensing terms

Author(s) will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Education Studies shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflicts of interest, copyright violations and inappropriate or inaccurate use of any kind content related or integrated into the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons Attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).