**Supplementary material**

**Appendix A. Colour test**

This test was given to the students in the experimental and control groups before and after instruction on the colour phenomena.

1. Consider a green plant in daylight. If we put it in a dark room and focus a red light on it, what will happen?
2. The plant remains green, because the colour of an object is a property of it.
3. Since red is darker than green and dark colours cover light colours, the plant turns red.
4. The colour of the light blends with the colour of the plant, and that causes the plant colour change.
5. The light gives its colour to the object, so the plant turns from green to red.
6. The plant is green because absorbs the other colours excluding green. So, in this case, the plant absorbs red and stays black.
7. During a theater scene, before the actors come on stage, two spotlights, one red and one green, were projected onto the same region of the stage. What colour resulted from the overlapping?
8. Red
9. Green
10. Yellow
11. Brown
12. Black

Justify your choice.

1. Mention eight colours you know.
2. Banana is a yellow fruit when illuminated by natural light. If we put it in a dark room, in which case the banana appears black? When it is illuminated by ...
3. Red light.
4. Green light.
5. Blue light.
6. Yellow light.
7. Banana will never appear black when is illuminated.
8. In a dark room, a flashlight emits blue light to a yellow pen. What colour is the shadow of the pen?
9. Red
10. Green
11. Yellow
12. Brown
13. Black
14. "All cats are gray in the dark." Who never heard this expression? It means that at night all cats look the same and with a grayish colour. This is because ...
15. the objects change colour when they are illuminated.
16. at low intensities, our visual system does not perceive the colour.
17. in the evening the objects are not illuminated so they get always gray.
18. in the evening cats change colour.
19. The statement is false. Cats have always the same colour, we just can’t see them.
20. in the night light is black, so the cats look like black.
21. Ann made two experiences. First, she mixed two watercolours, one red and one green, with a brush. After mixing the paints, she directed two spotlights, one red and one green, on the white wall in her house. What were the Ann’s results?
22. When she mixed the paints, Ann obtained brown, but when she mixed lights, obtained yellow.
23. In both cases, Ann obtained the same colour but with different shades.
24. In both cases, Anna obtained the same colour: brown.
25. When she mixed the paints, Ann obtained brown, but when she mixed lights, she obtained cyan.

**Appendix B. Detailed data on pre-tests results**

This table shows the results of the pre-tests, in both groups, before the instruction.

**Table 1** - Pre-tests’ answer choices (%)

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  | **Control Group** | **Experimental Group** |
| Question 1 | a) | 19.1 | 12.0 |
|  | b) | 12.3 | 10.8 |
|  | **c)** | **39.7** | **50.0** |
|  | d) | 9.3 | 13.2 |
|  | e) | 19.1 | 12.8 |
| Question 2 | a) | 3.4 | 4.0 |
|  | b) | 3.9 | 0.8 |
|  | **c)** | **61.8** | **72.4** |
|  | d) | 13.7 | 16.0 |
|  | e) | 15.2 | 6.8 |
| Question 3 | 0 | 11.3 | 6.0 |
|  | 1 | 25.5 | 25.6 |
|  | 2 | 51.0 | 51.6 |
|  | 3 | 8.3 | 13.2 |
| Question 4 | a) | 8.8 | 4.8 |
|  | b) | 9.3 | 3.6 |
|  | c) | 9.3 | 12.0 |
|  | d) | 6.4 | 6.0 |
|  | e) | **63.7** | **71.6** |
| Question 5 | a) | 3.9 | 3.6 |
|  | b) | **40.7** | **45.6** |
|  | c) | 9.8 | 8.0 |
|  | d) | 7.4 | 4.0 |
|  | e) | **36.8** | **37.2** |
| Question 6 | a) | 7.8 | 2.8 |
|  | **b)** | **37.7** | **51.2** |
|  | c) | 13.7 | 9.6 |
|  | d) | 5.9 | 2.4 |
|  | e) | 25.0 | 28.4 |
|  | f) | 9.3 | 4.8 |
| Question 7 | **a)** | **35.8** | **34.8** |
|  | **b)** | **38.2** | **33.6** |
|  | c) | 15.7 | 19.2 |
|  | d) | 9.3 | 11.2 |

*Note:* In Question 3, answers were classified according to whether Black, White and Gray were not mentioned as colours (0), or whether one (1), two (2) or all three (3) were mentioned. The most frequent answers are in bold.