



# Gender stereotypes and biases in primary students: efficacy of a school-based program

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## Abstract

This study evaluated the impact of a school-based pilot program designed to reduce gender stereotypes and biases in fourth-grade school children. The program used multiple strategies to reduce gender stereotypes and biases relating to social roles and to the agency-communion paradigm. It also aimed to improve egalitarian attitudes. One hundred and seventeen students, divided into two groups (control and intervention), were subjected to implicit and explicit measures before and after the program. After the educational program, results showed a significant reduction in gender stereotypes and biases and a significant improvement in gender egalitarian attitudes in the group which participated in the program (the intervention group), but not in the control one. Results discussion focused on the impact of the program for educational practices.

**Keywords** Gender bias · Gender stereotype · Primary school · School intervention

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Sara Gabrielli moved to the Link Campus University, in the role of Associate Professor of Experimental Pedagogy, in April 2025.

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## Theoretical framework

This paper aims to present an educational program for primary schools oriented to promote gender equality and inclusive attitudes. In this perspective, the educational program aligns with Agenda 2030<sup>1</sup> Sustainable Development Goals (SDGs), particularly SDG 5 (gender equality), by exploring relationships between genders to promote more inclusive social and educational environments, as well as SDG 4 (quality education), SDG 10 (reduced inequalities), and SDG 16 (peace and justice). To achieve these goals, there is increasing recognition of the importance of addressing gender stereotypes and prejudices. Indeed, reducing stereotypes, prejudices, and biases contributes to building a balanced, egalitarian, and peaceful society.

The pervasive cultural mindset in our society contributes to developing stereotypes and biases about individuals and groups, depending on their social categories (Perszyk et al., 2019). Identifying with a particular category is a key factor in children's intergroup attitudes (Bigler & Liben, 2006) and gender can be considered as a salient social category in the emergence of stereotypes and biases (Hilliard & Liben, 2010; Peragine et al., 2021).

Gender developmental patterns experience a complex and lengthy journey. As recognized by the literature (Martin & Ruble, 2010), this begins at around three months of age, with children distinguishing between categories of female and male faces, as demonstrated preferences (Quinn et al., 2002). In these terms, children have been shown to learn gender stereotypes before any other type (Zemore et al., 2000). By the age of three years, basic stereotypes are developed (Signorella et al., 1993), regarding physical appearance, roles, toys, activities, and some abstract associations with gender (Martin & Ruble, 2010). Adherence to gender stereotypes increases and shows a peak at five or six years (Miller et al., 2006), when children recognize that jobs more likely to be held by men are higher in status than female-typical jobs (Liben et al., 2001). Older children seem to be influenced by social desirability and to recognize the existence of gender stereotypes and biases; however, even if children acquire the mental flexibility to reject them, stereotypes and biases may lead to behavioral manifestations that are automatically activated (Banse et al., 2010).

Gender stereotypes represent "the constellations of characteristics which are said to characterize men more or less frequently than women" (Williams & Bennett, 1975, p. 1375 as cited in De Caroli & Sagone, 2007). These stereotypes are often automatically activated in children, determining behavioural manifestations of spontaneous stereotyping (Banse et al., 2010). Stereotypes can be conceptualized as schemas, defined as the organized knowledge structures about a concept or a stimulus, including its attributes (Fiske & Taylor, 1991). Such schemas contribute to creating representations or impressions of a social group (Smith & Mackie, 2000) which may lead to evaluations, judgments, or attitudes toward the social group, thereby fostering biases. Gender stereotypes play a significant role in shaping how information about women and men is interpreted and evaluated, making them a key mechanism in the development of gender bias (Heilman et al., 2024), conceptualised as evaluation based on expectations. Gender stereotypes and biases reflect the societal perceptions of gender roles. Although gender roles vary across societies and history, as recognized by Charafeddine and colleagues (2020), gender emerges as a social construct

<sup>1</sup> The 2030 Agenda is a global action plan adopted by all countries to promote sustainable development. It aims to eradicate poverty, protect the planet, and ensure peace and prosperity for all through 17 Sustainable Development Goals to be achieved by 2030, leaving no one behind. See: <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981> [28/01/2026].

that distinguishes men from women on a hierarchical basis which is also related to power, for example judging dominant behaviour and leadership more negatively when adopted by women than by men (Eagly et al., 1992). Perceivers assume that men are oriented toward agentic goals (e.g. self-assertion, self-expansion, and the urge to master) and women toward communal goals (e.g. selflessness, concern for others, sympathy) (Eagly & Steffen, 1984). Referring to societal roles, this can generate a vicious circle, in which women are perceived as being more often homemakers or employed in lower-status positions, and this perception reinforces the stereotype and leads women to choose to be more communal. Therefore, women remain underrepresented in high-status and leadership positions, have more limited control over resources than men, and continue to devote a greater share of their time to domestic work, which is unpaid and often socially undervalued (Charafeddine et al., 2020). Indeed, structural inequalities persist such that women, even when equally qualified as men, are less likely to attain jobs with higher social and financial returns or to reach positions of power (Heilman et al., 2024). Children in Western societies seem to aspire to jobs that follow traditional gender stereotypes, despite egalitarian trends in the labour market (Canessa-Pollard et al., 2022). Gender stereotypes about intellectual abilities also influence children's interest in their careers (Bian et al., 2017). As suggested by Cialdini & Trost, (1998), gender roles are based on both descriptive norms (expectations about what group members do and align with traditional gender stereotypes) and injunctive or prescriptive norms (which define what should be done) (King et al., 2021). Heilman et al., (2024) described the pathways from gender stereotypes to gender biases and discrimination referring to both descriptive and prescriptive gender norms, which foster biases and discrimination through distinct pathways: the descriptive by influencing performance expectations, and the prescriptive by penalizing departures from normative behaviour.

Gender-stereotypic beliefs and biases can lead to dysfunctional consequences for children and adults (Bigler, 1999), for instance social interactions, social roles in families and workplaces, and expression of personal interests, and can also have an impact on self-esteem, self-efficacy, and academic performance. In fact, children's interactions with peers, and learning are influenced by their gender-based biases (Gasparini et al., 2015). Psychological theories highlight the roles of the environment in determining children's knowledge and adherence to gender stereotypes (Spinner et al., 2021). One of the essential contexts for children's development is the school environment. Schools may play a key role in promoting inclusive educational environments and in reducing gender-based stereotypes and discriminatory attitudes. Nevertheless, schools can still reflect gender stereotypes and biases, in educational practices or in learning materials (e.g., Tandler et al., 2025). Within schools, gender stereotypes and biases contribute to unequal learning environments and play a significant role in shaping students' disciplinary preferences. In fact, preferences for academic disciplines are shaped by perceived congruence between students' self-stereotypical beliefs and the stereotypical image of a field, whereas perceptions of mismatch are associated with negative consequences (Leopold et al., 2025).

Some studies have evaluated the effectiveness of school-based interventions in reducing gender stereotypes and biases. Specifically, interventions aimed at reducing gender stereotypes in students often employ strategies such as the knowledge of stereotypes (e.g., Spinner et al., 2021), the counter-stereotypical models (e.g., Olsson & Martiny, 2018), or intergroup contact (e.g., Martin et al., 2017). Interventions are often designed for specific targets, such as adolescents (e.g., Sanz-Barbero et al., 2022), and for specific domains, such as gender-based violence (e.g., De La Rue et al., 2016) or to STEM (e.g., Weisgram & Bigler, 2007). When studied in children, gender prejudice and bias are more often considered in terms of toy/play associations (e.g., Zosuls et al., 2009) or media (e.g. Pahlke et al.,

2014), and most of these studies directly teach children what sexism is and how to recognize it (Lamb et al., 2009; Leaper & Brown, 2014). However, meta-analyses and reviews on school-based interventions (Aboud et al., 2012; Beelmann & Heinemann, 2014; Bigler, 1999; Ulger et al., 2018) suggest that a combination of different strategies might be the best course and more interventions should be aimed at reducing gender stereotypes, prejudices and biases in children.

Explicit stereotypes or prejudices are more widely investigated, even though stereotypes and prejudices have become increasingly subtle in many societies, and it seems important to explore how implicit biases lead to discriminatory behavior in children (Gabrielli et al., 2022; Leaper & Brown, 2017). Indeed, in the academic contexts, implicit domain-gender stereotypes seem to be more powerful in predicting and explaining academic gender differences than explicit domain-gender stereotypes; and implicit domain-gender stereotypes predict less liking, more negative attitudes and lower competence beliefs (Heyder & Kessels, 2013). Despite the growing literature on gender stereotypes, relatively few studies combined explicit and implicit measures in children (Kessels et al., 2014; Perszyk et al., 2019; Skowronski & Lawrence, 2001), highlighting the need for integrated approaches in school-based interventions.

## The present study

Given the gap highlighted in literature and the importance of interventions to reduce gender stereotypes and biases, we decided to implement a pilot of an educational program to reduce gender role stereotypes and biases in children in primary schools.

The educational program on gender stereotypes and biases refers to the above-mentioned literature, including meta-analyses and reviews, and capitalizes on findings about effective interventions for prejudices, biases, and stereotypes reduction. On this basis, the program combined different strategies to contrast the development of stereotypes and biases, and particularly knowledge of stereotypes (e.g. Spinner et al., 2021), counter-stereotypical models (e.g. Olsson & Martiny, 2018), intergroup contact (e.g. Allport, 1954), empathy and perspective-taking (e.g. Nesdale et al., 2005; Rutland & Killen, 2015), categorization and de-categorization (e.g. Brewer & Miller, 1988). The educational program was developed on the basis of previous literature on prejudice reduction interventions that has already been implemented in primary schools, which seems to be effective in reducing implicit ethnic prejudice (e.g., Gabrielli et al., 2022), adapting the described methodology to gender stereotypes and biases. It is structured as a long intervention, to be part of the school routines. To maintain cooperation between researchers and teachers and to guarantee a standardized intervention (Cameron & Rutland, 2016), the program employed a standardized protocol, developed cooperating with the teachers who implemented the intervention in the schools.

Moreover, the educational program considered both implicit and explicit measures to evaluate the effectiveness of the school intervention in reducing: i) implicit gender-role stereotypes; ii) explicit gender-role stereotypes; and iii) explicit gender-role biases. Explicit stereotypes regarding social roles are considered for occupations and child-caring/house-caring, according to previous literature on interventions to reduce stereotypes in children (Bigler, 1999). Explicit biases consider the comparison between males and females in the Italian school context, for example the gender orientation to languages or STEM disciplines (Zúñiga-Mejías & Huincahue, 2024). Implicit measures are also essential as they are

less affected by social desirability (Levy et al., 2016). As for implicit gender stereotypes, we refer to the agency-communion paradigm (Eagly & Steffen, 1984).

We focused on nine-year-old pupils in primary school. In fact, meta-analyses find that stereotypes become more flexible with age (Signorella et al., 1993), specifically around eight years. This could be a sensitive period for promoting interventions aimed at reducing gender stereotypes, biases, and prejudices. This approach also took into consideration the fact that, at this age, children's socio-cognitive development is adequate to recognize differences and similarities among individuals (Gabrielli et al., 2022).

We expected a greater decrease over time in the intervention group compared to the control group in: (a) implicit gender-role stereotypes, (b) explicit gender-role stereotypes, and (c) explicit gender-role biases.

## The school program

The educational program includes eight lessons, and the intervention was delivered to children between January 2023 and April 2023. For each lesson, Table 1 describes the title, the educational aims, the implemented activities, and the link between each theoretical argument (strategies to stereotypes' and biases' reduction) and the concrete activities implemented in the program.

## Methods

### Participants and design

The study involved a convenience sample of four primary schools in the metropolitan area of Rome. In each school, one experimental classroom and one control classroom participated, for a total of eight classrooms. The sample included 117 fourth-grade children (62 females;  $M_{age}=9.01$ ,  $SD=0.27$ ), of whom 99% were Italian. The final sample size reflected the number of classes that agreed to participate and the students for whom parental consent was obtained and who completed both the pre- and post-test assessments, as no a priori sample size target was established for this pilot study.

A nonrandomized quasi-experimental design was employed, using a 2 (Condition: control vs. intervention)  $\times$  2 (Time: T1 vs. T2) mixed design, with Condition as a between-subjects factor and Time as a within-subjects factor. The intervention group consisted of 58 children (26 females;  $M_{age}=9.00$ ,  $SD=0.26$ ), and the control group included 59 children (30 females;  $M_{age}=9.02$ ,  $SD=0.29$ ). Both groups were assessed at the beginning and end of the intervention. The control group did not receive any form of intervention during the study period and continued to engage exclusively in their regular school activities, whereas the intervention group participated in the educational program, lasting a total of 20 h.

### Procedure and instruments

The research's aims and procedures were approved by the participating schools prior to data collection. Written informed consent was obtained from all parents, and verbal consent was given by the children. Explicit measures were administered during school hours by trained pre-service teachers (fifth-year students in the Primary Education Degree Program at [deleted for blind review] University) within the classroom. These pre-service

**Table 1** Structure of the program

| Lessons                          | Objectives                                                                                                                                   | Activities                                                                                                                                                                               | Strategies                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| My experience                    | To reflect on children's own experience and identity                                                                                         | Children draw their own present and their imagined future                                                                                                                                | Knowledge of stereotypes emerging from male and female children's drawings                                                                                                                                                                                                                                                                              |
| The perspective as another child | To reflect on another gender child's experience and identity<br>To compare children's own and another gender child's experience and identity | Children draw the present and imagined future of a child of the opposite gender, then they reflect on differences between their own drawings and the ones imagining to be another person | Perspective taking and empathy, both cognitive and emotional, imagining to be another person<br>Knowledge of the stereotypes when comparing the drawings                                                                                                                                                                                                |
| Toponymy                         | To know how women are represented in street names<br>To explore the biographies of women underrepresented in public toponymy                 | Children discover key facts about diversity and representation in street names<br>Children explore biographies of women underrepresented in public toponymy                              | Knowledge of stereotypes in the under-representation of women on street names<br>Counter-stereotypical models in discovering biographies of women to name a street                                                                                                                                                                                      |
| Textbooks: from 1900 to nowadays | To know how women and men are represented in textbooks                                                                                       | Children explore female and male children's activities, roles, clothes, etc. in textbooks from 1900 to nowadays                                                                          | Knowledge of stereotypes emerging from old and recent textbooks, comparing the evolution of gender stereotypes through time<br>Categorization of the activities assigned to female or male characters in textbooks and de-categorization of those activities in other categories (e.g. hobby, profession)                                               |
| Who we are in advertisements     | To know how women and men are represented in advertisements and picture books                                                                | Children explore female and male children's activities, roles, clothes, etc. in advertisements and picture books                                                                         | Knowledge of stereotypes emerging from advertisements and picture books<br>Categorization of the activities assigned to female or male characters in advertisements and de-categorization of those activities in other categories (e.g. hobby, profession)<br>Counter-stereotypical models emerging from picture books dedicated to emotional education |

**Table 1** (continued)

| Lessons                          | Objectives                                                                                                  | Activities                                                                                                                                                                                                                                                                       | Strategies                                                                                                                                                                                                                                                                                             |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interview with a woman           | To recognize gender discrimination                                                                          | Children analyse videos showing gender discrimination and equity<br>Children create collectively an interview on gender discrimination<br>Children conduct a semi-structured interview aimed at exploring perceptions and experiences related to gender roles and discrimination | Empathy and perspective taking activated by the videos and the analyses of the character's feelings<br>Intergroup contact, when imagining and/or administering an interview to explore a woman's experience of gender discrimination                                                                   |
| Who are you?                     | To reflect on children's own identity                                                                       | Children answer the question "Who are you?" and first, categorize answers in females and males ones, then categorize answers in hobbies, personal qualities, etc                                                                                                                 | Categorization of the answers on identities on female and male ones; de-categorization of those answers in other categories (e.g. hobby, profession), also discussing which one are stereotypically associated to males and to females (e.g. on personal qualities "nice" for girls, "smart" for boys) |
| Counter-stereotypical role model | To reflect on the experience of a woman who represent a counter-stereotypical model for the Italian context | Children encounter a woman who represents a counter-stereotypical model (e.g. boxing instructor, firefighter, carpenter, astrophysicist)                                                                                                                                         | Direct contact of a woman's experience in a counter-stereotypical professional role                                                                                                                                                                                                                    |

teachers also participated in selecting and adapting existing instruments and creating ad hoc ones. Each of them administered the instruments and delivered the program in one classroom. The implicit measure was individually administered to each child by the same pre-service teacher in a quiet room outside the classroom.

The study was approved by the Ethics Commission at [deleted for blind review] University, and the procedure adhered to APA ethical standards for research involving children.

The pre-test (T1) was administered in January 2023 and the post-test (T2) in April 2023.

## Implicit stereotypes

Children's implicit gender stereotypes were assessed using an adapted version of the Child Implicit Association Test (Child-IAT; Baron & Banaji, 2006), previously used for ethnic prejudices (Pirchio et al., 2018), adapted according to the agency-communion paradigm (Eagly & Steffen, 1984). As described by Nosek et al., (2007), the IAT indirectly measures the strength of associations among concepts. The test consisted of seven blocks. The critical blocks involve simultaneous sorting of stimuli representing four concepts ("Males", "Females", "Agency", "Communion") with two response options. Participants categorized AI-generated portrait photographs of friendly-looking children (Misch et al., 2022; Generated Photos, 2021) in "Male" and "Female" categories. Verbal stimuli, based on the agency-communion paradigm (Eagly & Steffen, 1984), were presented via audio-recordings in order to be easily understood by children. Agency was presented through the word "Action" and communion through the word "Sharing". The vocal stimuli were the following, respectively: "Powerful"; "Strong"; "Independent"; "Lively" and "Friendly"; "Kind"; "Sociable"; and "Sensitive". Once participants familiarized with the task, they were asked to categorize a stimulus in either the "Male"/"Female" (picture) category or the "Action"/"Sharing" attribute (vocal word). The pairing of gender categories with attribute categories was randomized to reflect either stereotype-congruent ("Male-Action," "Female-Sharing") or stereotype-incongruent ("Male-Sharing," "Female-Action") combinations and then reversed in subsequent blocks. Positive scores support a stronger association between "Females-Communion" and "Males-Agency", while negative scores support the reverse. Scores under 0.15 denote little to no stereotypes; 0.15 to 0.35 a slight, 0.35 to 0.65 a moderate, and over 0.65 a strong stereotype (Greenwald & Nosek, 2001).

The Child-IAT was administered individually in a quiet room of the school and introduced to participants as a game, encouraging quick and accurate answers. This procedure was repeated on both pre-test and post-test. The Cronbach alpha coefficient was 0.85 for the pre-test Child-IAT.

## Explicit stereotypes

Explicit gender-role stereotypes were assessed using a picture-based questionnaire, adapted by Muscialini, (2013). The questionnaire shows six pictures of an anonymous character (a non-gender-defined person) with stereotyped objects or accessories, and each child was asked to determine if each character was male or female or could be both. We assigned 1 point for each answer compatible with Italian stereotypes, -1 point for each counter-stereotypical answer, and 0 point for each neutral answer. The Cronbach alpha coefficient was evaluated for all pictures, and this resulted in one of the pictures (a character with a broom) being eliminated to improve reliability. The total score for the questionnaire was

calculated by computing the mean for the remaining pictures. Higher scores denote higher stereotypes. The final Cronbach alpha coefficient was 0.65 for the pre-test.

## Intergroup bias

Each child also completed a scale ad hoc developed. The scale includes 11 items on a four-point Likert scale (1 = not at all; 2 = a little; 3 = moderately; 4 = a lot) representing affirmations usually employed in the Italian school context, comparing males' and females' attitudes and biases. Those affirmations also refer to literature, for example for the relation between gender and orientation to STEM (e.g., Cvencek et al., 2011), intellectual abilities (e.g. Bian et al., 2018), the idea that girls are more caring than boys or that boys should not cry (Cialdini & Trost, 1998). Affirmations refer both to descriptive norms and injunctive norms. Exploratory factor analysis shows the existence of three dimensions (see Supplementary materials), two of which can be related to the male and females biases and the last to a dimension of egalitarianism: pro-male bias (four items,  $\alpha=0.79$  at pre-test; e.g., "Usually, boys are better politicians than girls"); pro-female bias (four items,  $\alpha=0.77$  at pre-test; e.g., "Usually, girls get less dirty than boys"); and egalitarian attitudes (three items,  $\alpha=0.69$  at pre-test; e.g., "Boys and girls should have the chance to do the same things"). Higher scores denote greater bias for the first two factors and higher egalitarian attitudes for the third factor.

## Data analysis

First, exploratory factor analysis was conducted for the *Intergroup bias* scale composed of 11 items, the scale was created specifically for this study. The exploratory factor analysis was performed using the Principal Axis Factorization extraction method and the Oblimin rotation method with Kaiser normalization. The results of the exploratory factor analyses made it possible to identify three factors (*Pro-male bias*, *Pro-female bias*, and *Egalitarian attitudes*), for which internal consistency was verified using Cronbach's alpha coefficient (see Table 2). The resulting factors showed acceptable internal consistency, and Cronbach's alpha coefficient is above the acceptability level (Streiner, 2003) and varies from 0.69 to 0.79. From the analyses carried out, it is not possible for any of the factors to increase Cronbach's alpha score by omitting one or more items. The Kaiser–Meyer–Olkin measure

**Table 2** Factor analyses of the explicit sexism scale

| Subscales                             | Items                                                   | 1    | 2    | 3    |
|---------------------------------------|---------------------------------------------------------|------|------|------|
| Pro-Male Bias<br>$\alpha=.79$         | 3. Usually, men are better politician than women        | .693 |      |      |
|                                       | 4. Usually, men are better at fixing things than women  | .726 |      |      |
|                                       | 6. Boys are better at mathematics                       | .793 |      |      |
|                                       | 9. Boys cry less than girls                             | .780 |      |      |
| Pro-Female Bias<br>$\alpha=.77$       | 5. Girls are better at the Italian subject              |      | .669 |      |
|                                       | 1. Usually, girls are more intelligent than boys        |      | .905 |      |
|                                       | 2. Usually, girls are better at school than boys        |      | .893 |      |
|                                       | 10. Girls get dirty less than boys                      |      | .575 |      |
| Egalitarian attitudes<br>$\alpha=.69$ | 7. Girls can play football                              |      |      | .807 |
|                                       | 8. Boys can play with dolls                             |      |      | .672 |
|                                       | 11. Boys and girls should be able to do the same things |      |      | .766 |

of sampling adequacy is 0.76, and thus above the minimum value commonly considered sufficient of 0.6 (Field, 2013), and Bartlett's test of sphericity is significant ( $55=375.707$ ,  $p<0.001$ ). The three factors collectively explain 62.55% of the total variance. The first factor (Male stereotypes) explains 30.57% of the variance, the second factor (Female stereotypes) explains 21.01%, and the third (Egalitarian attitude) explains 10.98%.

Means and standard deviations for all study variables in the control group, the intervention group, and the total sample are reported in Table 3. The results from preliminary analyses showed that none of the study variables revealed significant deviation from normality, indicating no normality issues (values were less than |2| for skewness and less than |7| for kurtosis) (De Witte et al., 2013).

Finally, to test the hypothesis of the study and evaluate the impact of the program on children's explicit and implicit stereotypes, a series of 2 (Condition: control vs intervention)  $\times$  2 (Time: T1 vs T2) mixed-model ANOVA was carried out with simple effect analysis, in order to explore the effect of the intervention.

## Results

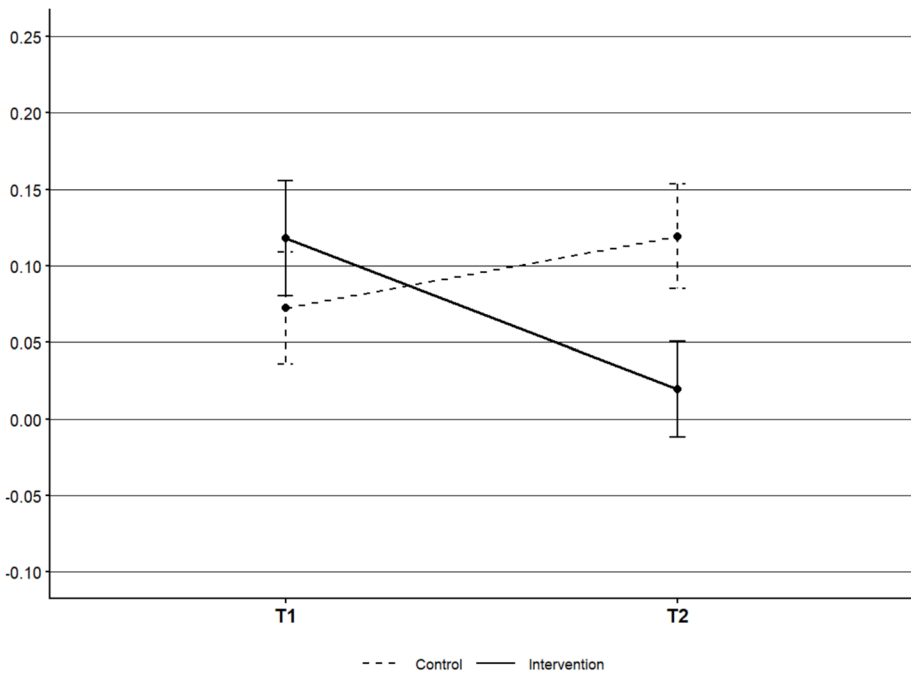
In the following paragraphs, the results of the 2  $\times$  2 mixed-model ANOVA analysis are presented.

### Implicit stereotypes

Results for implicit stereotypes showed no significant main effects for Condition [ $F(1,113)=0.397$ ,  $p=.530$ ,  $\eta^2=.00$ ] and no significant main effect for Time [ $F(1,113)=0.587$ ,  $p=.445$ ,  $\eta^2=.00$ ]. A significant two-way interaction emerged [ $F(1,113)=5.192$ ,  $p=.025$ ,  $\eta^2=.04$ ]. Results showed that implicit stereotypes decreased significantly in the intervention group but not in the control group (see Fig. 1). Results from simple effect analysis indicated that at T1, there were no differences between participants assigned to the control condition ( $M=0.07$ ,  $SD=0.28$ ) and the experimental condition ( $M=0.12$ ,  $SD=0.29$ ) [ $F(1, 115)=0.75$ ,  $p=.39$ ,  $\eta^2=.06$ ] regarding the level of

**Table 3** Means and standard deviations

| Variable                 | Control |     | Intervention |     | Total Sample |     |
|--------------------------|---------|-----|--------------|-----|--------------|-----|
|                          | M       | SD  | M            | SD  | M            | SD  |
| Age                      | 9.02    | .29 | 9.00         | .26 | 9.01         | .27 |
| Implicit stereotypes T1  | .07     | .27 | .11          | .28 | .09          | .28 |
| Implicit stereotypes T2  | .11     | .26 | .01          | .23 | .06          | .25 |
| Explicit stereotypes T1  | .61     | .28 | .67          | .28 | .64          | .28 |
| Explicit stereotypes T2  | .48     | .25 | .38          | .28 | .43          | .27 |
| Pro-male bias T1         | 2.26    | .90 | 2.38         | .73 | 2.32         | .81 |
| Pro-male bias T2         | 2.11    | .84 | 2.05         | .78 | 2.08         | .81 |
| Pro-female bias T1       | 2.21    | .80 | 2.46         | .93 | 2.33         | .87 |
| Pro-female bias T2       | 2.08    | .77 | 1.98         | .67 | 2.03         | .72 |
| Egalitarian attitudes T1 | 3.07    | .89 | 3.05         | .89 | 3.06         | .88 |
| Egalitarian attitudes T2 | 3.10    | .87 | 3.54         | .66 | 3.31         | .80 |

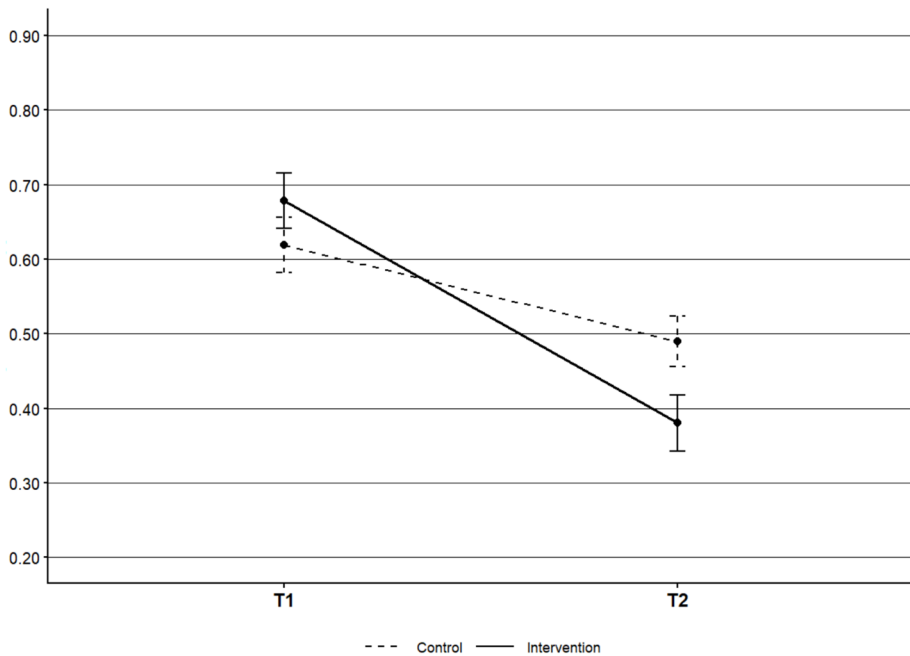


**Fig. 1** Implicit stereotype scores as a function of time and condition

implicit stereotypes. Instead, at T2, participants in the experimental condition showed significantly lower levels of implicit stereotypes ( $M=0.02$ ,  $SD=0.24$ ) compared to the control condition ( $M=0.12$ ,  $SD=0.26$ ) [ $F(1, 115)=4.64$ ,  $p=.03$ ,  $\eta^2=.039$ ]. Furthermore, no difference was found between T1 and T2 [ $F(1, 57)=1.08$ ,  $p=.30$ ,  $\eta^2=.02$ ] for the implicit stereotypes of participants assigned to the control condition. Instead, participants in the experimental condition showed lower levels of implicit stereotypes at T2 ( $M=0.02$ ,  $SD=0.24$ ) than at T1 ( $M=0.12$ ,  $SD=0.29$ ) [ $F(1, 56)=5.04$ ,  $p=.03$ ,  $\eta^2=.08$ ].

### Explicit stereotypes

Results for explicit stereotypes showed no significant main effects of Condition [ $F(1,112)=2.568$ ,  $p=.112$ ,  $\eta^2=.02$ ] and a significant main effect of Time [ $F(1,112)=29.351$ ,  $p<.001$ ,  $\eta^2=.20$ ]. A significant two-way interaction emerged [ $F(1,112)=8.224$ ,  $p=.005$ ,  $\eta^2=.06$ ], as shown in Fig. 2. Results from the simple effect analysis indicated no significant difference in the level of explicit stereotypes between participants in the control condition ( $M=0.62$ ,  $SD=0.28$ ) and those in the experimental condition ( $M=0.68$ ,  $SD=0.28$ ) at T1 [ $F(1, 115)=1.28$ ,  $p=.26$ ,  $\eta^2=.01$ ]. However, the significant main effect of Time showed a greater reduction in explicit stereotypes at T2 for the experimental condition [ $F(1, 56)=35.76$ ,  $p<.001$ ,  $\eta^2=.39$ ] compared to the control condition [ $F(1, 57)=16.50$ ,  $p<.001$ ,  $\eta^2=.22$ ]. Indeed, at T2, participants in the experimental condition exhibited significantly lower levels of explicit stereotypes ( $M=0.38$ ,  $SD=0.28$ ) than those in the control condition ( $M=0.49$ ,  $SD=0.26$ ) [ $F(1, 114)=4.71$ ,  $p=.03$ ,  $\eta^2=.40$ ].



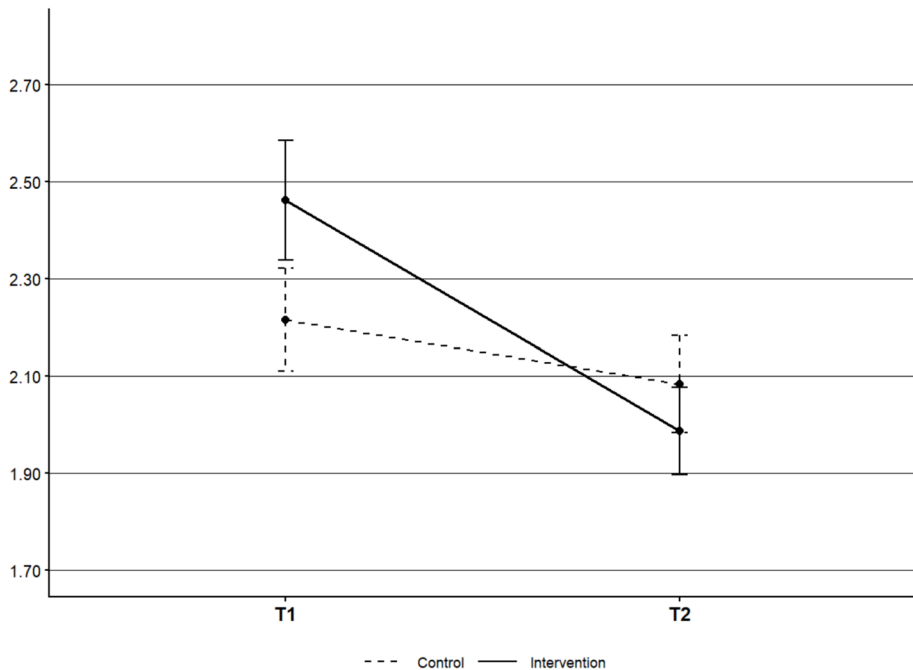
**Fig. 2** Explicit stereotype scores as a function of time and condition

### Intergroup bias

Results for *pro-male bias* showed no significant main effects for Condition [ $F(1,110)=0.346$ ,  $p=.558$ ,  $\eta^2=.00$ ] and a significant main effect for Time [ $F(1,110)=9.117$ ,  $p=.003$ ,  $\eta^2=.08$ ]. However, no significant two-way interaction emerged [ $F(1,110)=3.023$ ,  $p=.085$ ,  $\eta^2=.03$ ].

Results for *pro-female bias* showed no main effect for Condition [ $F(1,111)=0.372$ ,  $p=.543$ ,  $\eta^2=.00$ ]. A main effect was found for Time [ $F(1,111)=17.886$ ,  $p<.001$ ,  $\eta^2=.13$ ]. Importantly, a significant two-way interaction emerged [ $F(1,111)=5.054$ ,  $p=.027$ ,  $\eta^2=.04$ ], highlighting a higher decrease of pro-female bias in the intervention group compared to the control group (see Fig. 3). A simple effect analysis demonstrated that at T1, there was no significant difference in the level of pro-female bias between participants in the control condition ( $M=2.21$ ,  $SD=0.80$ ) and those in the experimental condition ( $M=2.46$ ,  $SD=0.94$ ) [ $F(1, 114)=2.29$ ,  $p=.13$ ,  $\eta^2=.02$ ]. However, considering the significant main effect of Time, pro-female bias significantly decreased at T2 in the experimental condition [ $F(1, 56)=15.73$ ,  $p<.001$ ,  $\eta^2=.22$ ], but not in the control condition [ $F(1, 57)=3.12$ ,  $p=.83$ ,  $\eta^2=.05$ ]. Furthermore, there was no significant difference in pro-female bias between the experimental condition ( $M=1.99$ ,  $SD=0.68$ ) and the control condition ( $M=2.08$ ,  $SD=0.77$ ) at T2 [ $F(1, 114)=0.51$ ,  $p=.48$ ,  $\eta^2=.04$ ].

Results for *egalitarian attitudes* underlined no significant main effects for Condition [ $F(1,112)=2.010$ ,  $p=.159$ ,  $\eta^2=.01$ ] and a significant main effect for Time [ $F(1,112)=11.904$ ,  $p<.001$ ,  $\eta^2=.09$ ]. Moreover, a significant two-way interaction emerged [ $F(1,112)=9.564$ ,  $p=.003$ ,  $\eta^2=.07$ ]. The analysis of simple effects indicated that at T1, participants' levels of



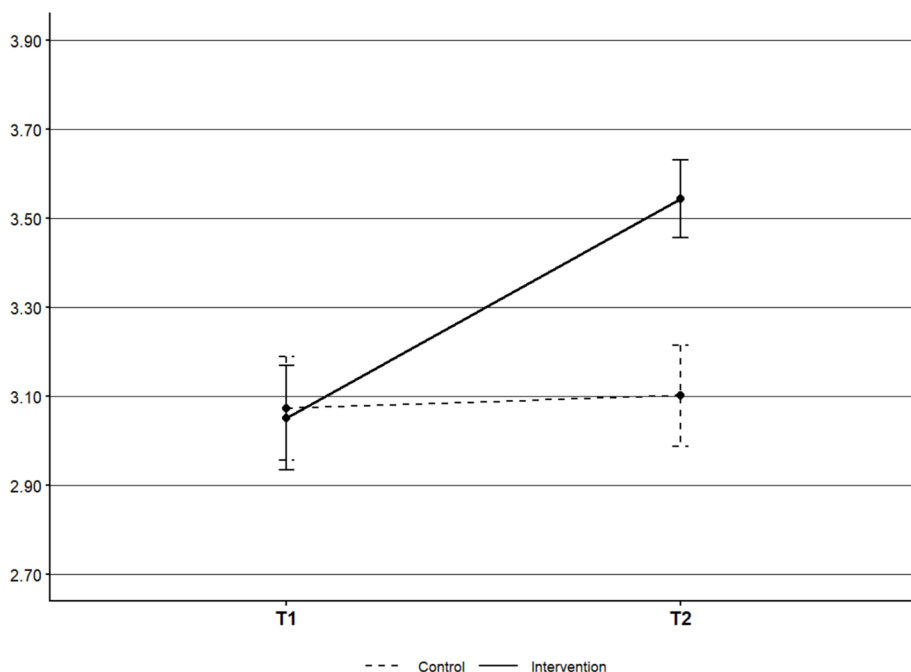
**Fig. 3** Pro-female bias scores as a function of time and condition

egalitarian attitudes were similar between the control condition ( $M=3.07$ ,  $SD=0.89$ ) and the experimental condition ( $M=3.05$ ,  $SD=0.89$ ) [ $F(1, 115)=0.02$ ,  $p=.89$ ,  $\eta^2=.00$ ]. However, over time, there was a significant increase in egalitarian attitudes at T2 within the experimental condition [ $F(1, 56)=16.50$ ,  $p<.001$ ,  $\eta^2=.23$ ], whereas the control condition showed no significant change [ $F(1, 57)=0.03$ ,  $p=.85$ ,  $\eta^2=.01$ ]. Indeed, at T2, the level of participant egalitarian attitudes for the experimental condition was significantly higher ( $M=3.54$ ,  $SD=0.66$ ) than for the control condition ( $M=3.10$ ,  $SD=0.87$ ) [ $F(1, 114)=9.38$ ,  $p=.003$ ,  $\eta^2=.08$ ]. Results suggest that egalitarian attitudes significantly increased more in the intervention group compared with the control group (see Fig. 4).

## Discussion

The current study had the objective of evaluating the effectiveness of a school pilot program designed to reduce gender stereotypes and bias in primary school children. To the best of our knowledge, this program is one of the first school-based interventions combining implicit and explicit measures to evaluate the effectiveness of the intervention and to focus on gender stereotypes and biases.

Results showed that the program significantly reduced children's implicit and explicit gender stereotypes in the intervention group but not in the control group. Although the children's implicit gender stereotyping was already quite limited even before the intervention for both groups, it is important to underline the finding that this reduced even further for the children who participated in the intervention but not for the others. The results



**Fig. 4** Egalitarian attitude scores as a function of time and condition

of the exploratory factor analyses made it possible to identify three factors: pro-male biases, pro-female biases, and egalitarian attitudes. Results showed a significant reduction in pro-female biases in the intervention group but not in the control group, and a significant increase in egalitarian attitudes in the intervention group but not in the control group, although baseline levels of egalitarian attitudes were already high before the intervention in both groups, with a mean score higher than the mean score for the scale. Egalitarian gender attitudes are particularly relevant as they have been associated with more favorable mental health outcomes among adolescents (King et al., 2021). Results also showed a reduction in pro-male biases, significant in the intervention, not in the control group.

The pilot program for gender stereotypes and biases seems to be relevant for its encouraging results obtained both on implicit and explicit measures. Future research should further evaluate the applicability of the intervention in broader educational contexts.

## Limitations and future research

The findings suggest that the pilot program may have contributed to reducing some gender stereotypes and biases. However, the study presents some limitations. As the study was conducted within a limited number of intact classes, future research involving a larger number of schools and classrooms will be essential to confirm and extend these preliminary findings. Moreover, wider samples could be investigated, also involving children from diverse cultural and religious backgrounds, to verify the effectiveness of the program in those contexts where stereotypes and biases are strongly settled. Moreover, a wider sample could be investigated involving children of different ages and school levels. Furthermore,

the small number of participating classes did not allow the use of multilevel models to account for the nested structure of the data. Future studies involving a larger number of classes or schools will be essential to apply hierarchical approaches and to examine in greater depth potential classroom-level effects.

We only measured stereotypes and biases at two time points, before and after the intervention. It would have been interesting to test measures at a third point, to verify the effectiveness of the program beyond the immediate end of the intervention. Further limitation concerns the use of a control group that did not participate in an alternative structured activity. Therefore, some differences between groups may be partially attributable to the experience of taking part in a structured program rather than to the specific components of the intervention. Future studies could address this issue by employing an active control condition to better isolate program-specific effects.

Furthermore, we could not assign participants randomly to control and intervention groups, since we had to implement the educational program in existing classes. Future research should consider a follow-up and a randomized sample.

Although research has shown that gender–power associations and related stereotypes can already emerge during the preschool years (e.g., Charafeddine et al., 2020), the present intervention was specifically designed for late primary school children. Several components of the program require cognitive, linguistic, and metacognitive skills – such as perspective-taking, guided discussion, and reflection on abstract concepts like bias and discrimination – that are more reliably developed at this age. In addition, the intervention was developed in close collaboration with teachers and aligned with the fourth-grade curriculum. Importantly, this choice does not imply that earlier interventions would be ineffective; rather, adapting the present program for younger children would require substantial modifications in content and methodology. Early interventions therefore represent an important direction for future research.

Looking forward, we hope that the program will be implemented in more schools, as it is designed to be part of the school curriculum. Moreover, we hope the program to be adapted and effective in reducing other social intergroup stereotypes, biases and prejudices.

## Conclusions

The present study evaluates the impact of a school-based pilot program designed to reduce gender stereotypes and biases in primary school children. The educational program for primary schools was also focused on promoting gender equality, addressing the United Nations' Agenda 2030 for Sustainable Development. Our study aimed to contribute to the literature on the effectiveness of school-based interventions for the reduction of gender stereotypes and biases in primary schools (e.g. Ulger et al., 2018). Studies on school-based interventions offer important implications for both educational practice and policy. Literature supports the integration of structured and evidence-informed interventions within the regular curriculum as a sustainable strategy for promoting gender equality and social inclusion.

The pilot program highlights the potential of evidence-based and multifaceted approaches in reducing gender stereotypes and biases from an early age, which may support the development of more inclusive interpersonal attitudes and reduce stereotypical gender representations. Importantly, the implementation of such a program could have a tangible impact on classroom dynamics. While the present pilot study did not directly assess broader classroom or school-level outcomes, such as peer interactions or classroom climate, existing literature suggests that interventions addressing stereotypes may have

positive effects on these dimensions (e.g. Bacchini et al., 2021; Dessel, 2010). They could contribute to shaping the organizational culture of the school environment, encouraging teachers to critically reflect on their own implicit biases and to adopt more gender-sensitive approaches in curriculum planning, classroom management, and school communication. From this perspective, school-based interventions may be a promising way to foster more inclusive learning environments. Future research should build on these preliminary findings by including larger samples, longitudinal designs, and direct measures of classroom dynamics and school climate, to better understand the wider impact of gender-focused educational interventions on both individual and contextual outcomes.

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**Data availability** The data and code that support the findings of this study are available from the corresponding author, SG, upon reasonable request.

## Declarations

**Ethics approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Approval was obtained by Roma Tre University Ethical Committee.

**Consent to participate and for publication** Written informed consent was obtained from all parents of the children included in the study, explaining aims, methods, data collection, privacy statement and publication.

**Competing interests** No potential conflict of interest was reported by the authors.

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#### Current themes of research

Her research concerns prejudice development and reduction in primary school children; teaching Italian as a second language; migrants' inclusion in Italy; resilience development.

*Most relevant publications*

- Gabrielli, S., Benvenuto, G., Sposetti, P., Szpunar, G. (2022). Provincial Centres for Adult Education (CPIA) as resources for the inclusion of migrant adults in Italy. In Fatigante, M., Zuccheromaglio, C., Alby, F. (Eds.) *Interculturality in institutions: symbols, practices and identities* (pp. 19–39). Springer. E-book ISBN: 978–3–031–12626–0. Hardcover ISBN: 978–3–031–12625–3.
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*Current themes of research*

Her broader interest focuses on how to promote the socio-emotional adaptation of children in situations of social exclusion, inequality, immigration and poverty.

*Most relevant publications*

- Zava, F., Cirimele, F., Perucchini, P., & Vecchio, G. M. (2025). Promoting Sympathy, Empathic Self-Efficacy, and Prosocial Behaviours Among Primary School Children. *International Journal of Psychology*, 60(4), e70058.
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- Vecchio, G. M., Zava, F., Zuffianò, A., Gerbino, M., Pastorelli, C., Kanacri, B. P. L., & Caprara, G. V. (2025). Enhancing prosocial behaviors, reducing aggression: Effects of CEPIDEAS junior in primary school. *Journal of Applied Developmental Psychology*, 99, 101835.

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*Current themes of research*

Her main research interests are in the domain of social psychology: social identity, intra-group and inter-group processes; environmental psychology; community psychology; wellbeing and happiness; implicit social cognition.

*Most relevant publications*

- Krys, K., Kostoula, O., van Tilburg, W. A., Mosca, O., Lee, J. H., Maricchiolo, F., ... & Uchida, Y. (2024). Happiness maximization is a WEIRD way of living. *Perspectives on Psychological Science*, 17456916231208367.
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*Current themes of research*

His research concerns the development and promotion of prosocial behaviors in childhood and adolescence; the development of emotional self-efficacy; and evidence-based programs for the development of social-emotional competences at school.

*Most relevant publications*

- Zava, F., Cirimele, F., Perucchini, P., & Vecchio, G. M. (2025). Promoting Sympathy, Empathic Self-Efficacy, and Prosocial Behaviours Among Primary School Children. *International Journal of Psychology*, 60(4), e70058.
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*Current themes of research*

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*Most relevant publications*

- Szpunar G. (2025). La normalizzazione della discriminazione e della violenza di genere in una prospettiva sociocognitiva. In P. Bastianoni, S. Zanazzi (Eds.). *Violenza di genere: pensieri, parole, comportamenti* (35–50). Milano: Biblion Edizioni. (Collana Le emergenze dell'Educazione).
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*Current themes of research*

Her research concerns social-cognition development; social adjustment in preschool and primary school children; parents and teachers' belief on children development and education; communicative and gestural development in infancy.

*Most relevant publications*

- Zava, F., Cirimele, F., Perucchini, P., Vecchio, G.M. (2025). Promoting Sympathy, Empathic Self-Efficacy, and Prosocial Behaviours Among Primary School Children. *International Journal of Psychology*, 60(4) [<https://doi.org/10.1002/ijop.70058>].
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