

REPORT

Does surgency moderate the relationship between parenting and children's aggression in middle childhood?

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Abstract

Parenting and child temperament have both been linked to aggression among children. This study explores the moderating effects of children's surgency and sex and paternal/maternal parenting practices on aggressive behaviour in middle childhood. We analyse whether the moderating effects observed fit a Diathesis-Stress, Differential Susceptibility or Vantage Sensitivity model. Participants were 203 school children aged 7–8 years ($M = 92.42$ months, $SD = 3.52$) from southern Spain. Maternal inconsistency and coercion and paternal hostility and indulgence, had a direct effect on children's aggressive behaviour. The effects of maternal hostility and anticipatory problem solving on children's aggression were moderated by surgency (Diathesis-Stress), as was the effect of paternal coercion on aggression (Vantage Sensitivity). Children's sex was not found to moderate any effect. It therefore seems that not all children are equally sensitive to the influence of parenting on their aggression levels, and that this influence depends on their temperament.

Highlights:

- This study explores the moderating effects of children's surgency and sex and paternal/maternal parenting practices on aggressive behavior.

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- Children's surgency moderated the effect of maternal hostility and anticipatory problem solving on children's aggression, with both effects fitting a Diathesis-Stress model.
- Children's surgency moderated the effect of paternal coercion on children's aggression, with this effect fitting a Vantage Sensitivity model.

KEYWORDS

aggression, diathesis-stress, middle childhood, parenting, surgency

1 | INTRODUCTION

Although from an evolutionary perspective, human aggression can be considered an adaptive and essential behaviour for human evolution, from a psychopathological perspective, it has been associated with conduct problems and risk behaviour (for a review, see Eisner & Malti, 2015). Maladaptive aggression can be observed from early childhood, although, in most cases, children learn to control it and antisocial behaviour tends to decline over time. Nevertheless, some children display this behaviour in a systematic and recurrent manner, and when this occurs, it is necessary to act early on in order to avoid the development of risk behaviours (substance abuse or delinquency, etc.) in later life stages such as adolescence or adulthood (Álvarez-García et al., 2019; Tremblay, 2010). Some authors emphasize the importance of intervening before the age of eight, reinforcing the development of cognitive, social and moral skills in childhood (Bor, 2004; Connor et al., 2006; Del Barrio et al., 2009). It has also been suggested that the absence of interventions during these early stages increases the risk of aggressive behaviours beginning to intensify, making future interventions difficult (Thompson et al., 2011). It even seems that interventions in later stages, such as adolescence, could, in some cases, end up exacerbating rather than reducing these behavioural problems (Jackson & Ellis, 2009; Tremblay, 2008). Furthermore, empirical evidence on sex differences suggests that boys are more physically and verbally aggressive than girls (Archer & Côte, 2005; Pascual-Sagastizabal et al., 2021; Sánchez-Martin et al., 2011). Although sex differences in indirect aggression are not so clear, some studies have reported a higher frequency in girls than in boys (Eisner & Malti, 2015).

Some biological aspects (e.g., child temperament) and contextual factors (e.g., family) have been linked to children's social adjustment (Yoleri, 2014). Temperament, understood as "constitutionally based differences in reactivity and self-regulation in the domains of emotionality, motor activity and attention" (Rothbart et al., 2006, p. 466), has been associated with aggressive behaviour in both childhood and adolescence.

Rothbart and Bates (2006) identified three components of temperament that they termed *negative affect*, *effortful control* and *surgency/extraversion*. This last component may be similar to the adult trait of personality *extraversion*, since it includes sociability, the absence of shyness, the tendency to display positive emotions and an open approach to new events. In adulthood, surgency also refers to social dominance. In childhood, however, the term refers mainly to high impulsivity levels, high levels of activity and high intensity pleasure (Holmboe, 2016).

Most research into the relationship between temperament traits and aggression in children has focused principally on negative affect and effortful control (Witting & Rodriguez, 2019), with the association between surgency and children's aggression being much less studied. Moreover, the few results that have been reported are controversial (Slagt, 2017; Slagt, Dubas, Deković, & van Aken, 2016; Zubizarreta et al., 2019). In most cases, however, studies exploring the influence of surgency in general have found that children with high surgency levels have higher levels of aggressive behaviour, due to the fact that they seem to be more sensitive to the effects of parenting styles and the environment (Aron et al., 2012; Lewis-Morrarty et al., 2012; Rothbart & Bates, 2006; Rothbart & Putnam, 2002).

Temperament is not the only force that influences children's behaviour, the family being another important factor, with parents being critical agents of socialization in children's adjustment and psychological development (Bornstein, 2012). Moreover, it has been suggested that parenting practices may be one of the best family indicators of the development of children's behaviour (Braza et al., 2015). Specifically, a warm and responsive parenting style seems to foster children's social adjustment, whereas adverse parenting practices (e.g., harsh discipline and negligent, authoritarian, permissive or inconsistent parenting) predict maladaptive behaviour (Di Maggio & Zappulla, 2014; Flouri & Midouhas, 2017; Hosokawa & Katsura, 2019; Moreno Méndez et al., 2020; Pinquart, 2017). Nevertheless, other authors have also pointed out that an excessive level of warmth, a high level of intrusive control and parental overprotection may be harmful, hampering the development of children's social skills and autonomy (particularly during adolescence) and exacerbating behavioural problems such as aggression, substance abuse and delinquency, among others (Baer et al., 2015; Chen & Schmidt, 2015; Pinquart, 2017).

From the middle of the last century, interest in studying how parenting practices influence child outcomes has resulted in the identification of different parenting styles (Becker, 1964; Schaefer, 1959). The most widely-used system is that established by Baumrind (1966), who identified three parenting styles: authoritarian, authoritative and permissive. The authoritarian parenting style is characterized by the imposition of norms, harsh discipline, the use of punishments and the absence of dialogue and affectivity. Authoritative parenting refers to a style in which, although parents establish limits and norms, they are sympathetic, responsive and warm. Finally, the permissive parenting style is that in which parents adopt an affectionate and communicative attitude, but demand very little from their children (Lozano et al., 2007).

More recently, another parenting practice has been identified that is not completely warm/responsive, permissive, harsh or negligent, and could even be seen as being orthogonal to the classical dimensions defined by Baumrind (1966). This parenting practice has been called "over-parenting" and includes behaviours related to the anticipatory solving of children's problems, the management of advise and the promotion of children's self-direction (Segrin et al., 2012). However, no clear results have yet been reported regarding how this paternal or maternal practice affects children's behaviour or even if it does so in all developmental stages (Baer et al., 2015; Chen & Schmidt, 2015; Segrin et al., 2012). Some studies have suggested that overprotection by mothers has a strong influence in the early years, whereas overprotection by fathers seems to mainly affect adolescents (Verhoeven et al., 2011). Furthermore, it has been suggested that maternal over-parenting predicts only daughters' behaviour, whereas paternal over-parenting predicts only sons' behaviour (Gere et al., 2012; Nishikawa et al., 2010). McMahon et al. (2019) observed that fathers with a more intrusive parenting style influence their children's behaviour, predicting higher levels of externalizing behaviours. Moreover, over-parenting has also been linked to diverse outcomes during adulthood, including problems with autonomy, emotion regulation, drug abuse, life satisfaction and academic success (LeMoyné & Buchanan, 2011; Padilla-Walker & Nelson, 2012; Segrin et al., 2012). Regarding the influence of this parenting practice during adulthood, some studies have found that paternal overprotection seems to have a stronger negative effect on adult well-being than maternal overprotection (Klein & Pierce, 2009; Love et al., 2019; Rousseau & Scharf, 2015). These differences in the influence of over-parenting by mothers and fathers may be due to the fact that maternal overprotective practises seem to be more common, whereas children may view paternal overprotection as an unusual type of behaviour by the father figure, resulting in it having a stronger negative influence on their adjustment (Rousseau & Scharf, 2015).

Nevertheless, as some authors have previously pointed out, relationships between parenting styles and children's behaviour are bidirectional. Consequently, just as parenting practices influence children's behaviour, so children's behaviour influences parents and affects their parenting strategies (De Haan et al., 2012; Grusec & Davidov, 2010; Lansford et al., 2011; Padilla-Walker et al., 2012; Verhoeven et al., 2010; Wang et al., 2011). For instance, parents who use harsh discipline to prevent children's antisocial behaviour may provoke the development of a coercive cycle of hostile behaviours between parents and children (Hinshaw, 2008; Lansford et al., 2011; Wang & Kenny, 2014).

Most researchers interested in exploring how parenting practices affect children's behaviour have only taken maternal practices into account, with paternal practices being largely overlooked despite fathers' increased involvement in raising their children (Braza et al., 2015; Pascual-Sagastizabal et al., 2021; Ren & Zhang, 2018; Reuben et al., 2016). However, there is some empirical evidence to suggest that mothers and fathers may have a differential influence on their children's behaviour; moreover, this influence seems to be different for boys and girls and may vary throughout development (Rinaldi & Howe, 2012; Tavassolie et al., 2016). In this sense, examining mothers' and fathers' influence separately may improve our knowledge of children's development in the family context. Accordingly, in the present study, we analyse the differential influence of maternal and paternal parenting practices on children's aggression.

By nature, child development is very complex and cannot be explained by the influence of independent factors alone. Consequently, researchers have been interested in exploring the possible moderating effect of temperament and family factors on children's aggression (Slagt, 2017). Traditionally, research has mainly focused on the moderating role of family in the associations between children's temperament and behavioural problems. However, the moderating role of child factors on the association between family variables and children's behaviour is also a useful perspective, from both an analytical and a theoretical point of view (Chen & Schmidt, 2015).

In this sense, some authors have suggested that parenting may not have the same effect on all children's behaviour (Morris et al., 2002). Indeed, it has been shown that a conflictive family climate or the use of harsh, inconsistent and/or coercive parenting, promotes the development of aggressive behaviour in children with high levels of shyness, moodiness or impulsivity (Bates et al., 2014; Slagt, Dubas, & van Aken, 2016). For instance, Rioux et al. (2016) showed how children who were highly impulsive at age six and had parents who employed a coercive parenting style tended to drink alcohol more frequently than others when they became adolescents. These children seem to benefit more than others from a parenting style characterized by warmth and emotional support (Pitzer et al., 2011).

For their part, Chen et al. (2014) found that children with high levels of surgency had more behavioural problems when they received low-quality maternal parenting; however, at the same time, they benefited more than children with low levels of surgency when maternal parenting was positive, displaying fewer inadequate behaviours. Similarly, del Puerto-Golzarri et al. (2022) found that boys with high levels of surgency whose fathers employed an authoritarian parenting style displayed more reactive aggression. Similar findings were observed by Witting and Rodriguez (2019), although in this case in relation to mothers, with infants with high levels of surgency and authoritarian mothers seeming to display more externalizing and internalizing problem behaviours. These authors also found that infants with low levels of surgency and permissive parents seemed to exhibit more externalizing problems, due to the fact that their parents failed to satisfy their needs.

It has been suggested that individuals with specific temperament traits may differ in their sensitivity to the influences of specific environments (Kiff et al., 2011; Obradović et al., 2010). Consequently, several theoretical models have been developed to explain the moderating role of temperament in the relationship between contextual influences and children's behaviour.

First, the Diathesis-Stress model (Monroe & Simons, 1991; Zuckerman, 1999) posits that certain temperament traits render some individuals more vulnerable than others to the effects of adverse environments on their outcomes (Belsky & Pluess, 2009, 2012; Slagt, Dubas, Deković, & van Aken, 2016). For instance, Kiff et al. (2011) observed that children with high levels of frustration and impulsivity and low levels of self-control were more vulnerable than others to negative parenting practices.

Second, the Differential Susceptibility model (Belsky, 1997, 2005; Belsky & Pluess, 2009) posits that a particular temperament type or trait can make a person more sensitive than others to environmental influences, both "for better" and "for worse". Thus, individuals with these characteristics may be more damaged than others by adverse contexts but, at the same time, they may also benefit more than others from favourable environments. In this sense, Obradović et al. (2010) found that high levels of negative affect may promote social imbalance in subjects who live in adverse family contexts, whereas these same levels of negative affect seem to act as a beneficial factor in supportive family environments.

Finally, the Vantage Sensitivity model (Pluess & Belsky, 2013; Sweitzer et al., 2012) argues that people with some specific temperament traits benefit more than others from enriched environments, although they are not harmed any more or less by the influence of an adverse context than other individuals without such characteristics.

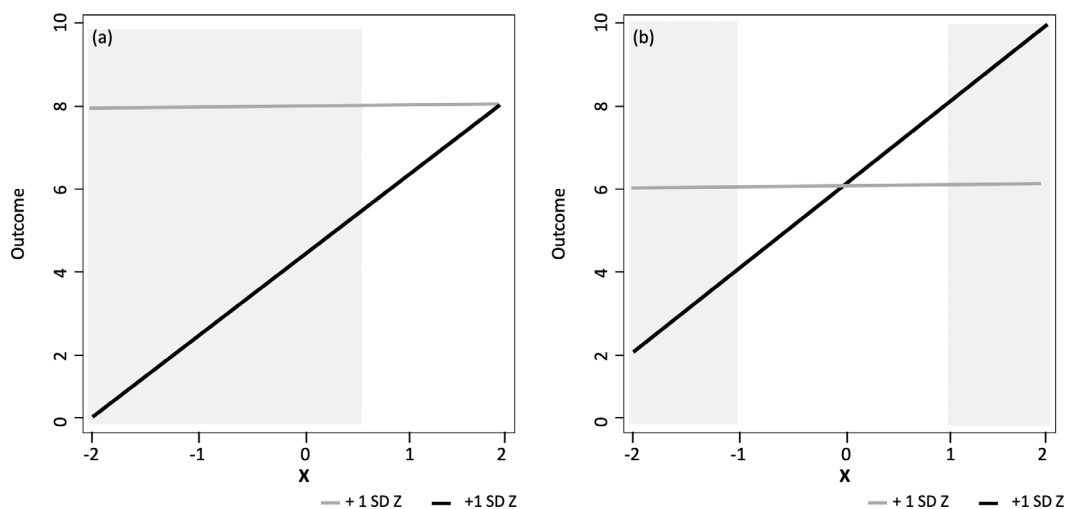


FIGURE 1 Theoretical models (Roisman et al., 2012, p.393)

In order to determine whether the associations between variables can be explained by any of these models (Diathesis-Stress, Differential Susceptibility or Vantage Sensitivity), it is necessary to analyse some statistical parameters, including regions of significance on Z (RoS on Z), which “refer to the range of values of the moderator for which the independent and dependent variable are significantly associated”, or in other words, “all possible values of Z for which there are significant regressions of Y on X” (Roisman et al., 2012, p. 391); and regions of significance on X (RoS on X; $\pm 2SD$), which “examine the values of X for which the moderator and outcome variable are significantly related” (Roisman et al., 2012, p. 392). If associations are significant only at the low end of X, this fits the Diathesis-Stress model; in contrast, if associations are significant only at the high end of X, this fits the Vantage Sensitivity model. Finally, if associations between moderator and outcome are significant at both the low and high ends of X, this fits the Differential Susceptibility model (Figure 1).

Another parameter is the Interaction Proportion Index (Pol), which indicates “the proportion of the total area between the lines of an interaction plot -bounded by $\pm 2SD$ -” (Del Giudice, 2017, p.5). Consequently, following the procedure described by Roisman et al. (2012), a case that fits the Differential Susceptibility model would have Pol values of between 0.40 and 0.60; a case that fits the Diathesis-Stress model would have Pol values very close to 0.00; and a case that fits the Vantage Sensitivity model would have Pol values of approximately 1.00.

Finally, the Proportion Affected (PA) index allows researchers to estimate the proportion of individuals who are differentially affected by the moderator (del Giudice, 2017; Roisman et al., 2012, p.5). In a case fitting the Differential Susceptibility model, the PA index would be around 50%, whereas in a case fitting the Diathesis-Stress model, it would be around 0%.

In general, fewer studies focus on middle childhood than on other developmental stages, despite the fact that this stage is usually characterized by an increase in behavioural problems and involves some significant psychological changes (Kessler et al., 2005; Prencipe et al., 2011). Most studies that have sought to explore how temperament may moderate the influence of family on children's adjustment have been carried out with infants or adolescents, with few studies focusing on middle childhood (Slagt, 2017).

For their part, studies on temperament traits have mainly explored the moderating role of negative affect or effortful control on the relationship between family and children's behaviour, whereas research into the moderating role of surgency is still scarce (Slagt, Dubas, Deković, & van Aken, 2016; Slagt, Dubas, & van Aken, 2016).

Finally, since both parents and teachers interact in the development of adjustment among school-age children, the use of a multi-informant methodology is considered a key tool in psychological research, providing greater insight

into children's behaviour and more information for developing interventions and prevention programmes at school (Sarmiento-Henrique et al., 2017).

In light of the above, the present study was divided into two stages: an exploratory stage designed to analyse and determine which interactions between parenting and surgency were eligible for inclusion in the second stage, during which a confirmatory model was tested. In the exploratory stage, our aim was to increase existing knowledge of surgency since most research to date has been focused on analysing the influence of negative affect or effortful control on children's behaviour, whereas studies exploring the role of surgency are much scarcer.

The present study therefore aimed to explore the possible additive and/or moderating effects of children's surgency and sex and some maternal and paternal parenting practices (warmth/induction; inconsistency; hostility; coercion; indulgence; and anticipatory problem solving) on aggressive behaviour among children in middle childhood (7–8 years old). Whenever moderating effects were found, we determined whether they fit the Diathesis-Stress, Differential Susceptibility or Vantage Sensitivity model.

Since, to the best of our knowledge, few studies have sought to analyse associations between parenting style and surgency and to determine which theoretical model said associations fit best, it was not possible to establish specific hypotheses. Consequently, we were only able to formulate a general hypothesis about these associations, namely that we expected children with high levels of surgency to be more sensitive to the influences of certain parenting styles characterized by low levels of monitoring, high levels of demand and rule setting and high levels of hostility.

2 | MATERIALS AND METHODS

2.1 | Participants

Participants were 203 school children, 96 boys (47.3%) and 107 girls (52.7%), aged 7–8 years ($M = 92.42$ months, $SD = 3.52$), from five different primary schools located in Chiclana and Puerto Real (Cadiz, Andalusia, southern Spain). According to the ad hoc Sociodemographic Questionnaire completed by the children's families, all had a medium/medium-high socioeconomic status. Most children (90.15%) came from two-parent families, and their parents' average ages were 37.59 years ($SD = 7.97$) for fathers and 36.87 years ($SD = 12.45$) for mothers.

2.2 | Procedure

All participants were selected using an incidental sampling process and were recruited from five primary schools located in Chiclana and Puerto Real (Andalusia, Spain). A total of 14 different classes containing different numbers of children were included (total sample: 203 children). The study was conducted in accordance with the Declaration of Helsinki. Parents and teachers provided written informed consent and completed several questionnaires at home and at school, respectively, during January, February and March (second school term in Spain). Children completed a questionnaire about peer aggression individually at the end of the third school term (May and June).

2.3 | Measures

2.3.1 | Sociodemographic questionnaire

Family environment was assessed using an ad hoc questionnaire. Fathers and mothers jointly reported information about their own age, education level, professional group and employment status. They were also asked to describe the composition of their household and state their children's ages.

2.3.2 | Parenting styles and dimension questionnaire

Parenting practices were measured using the short version of the *Parenting Styles and Dimension Questionnaire* (PSDQ; Robinson et al., 2001), which was completed by mothers and fathers separately. This instrument contains 32 items scored on a Likert-type scale ranging from (1) “never” to (4) “always”. Items are classified into three dimensions, based on Baumrind’s parenting typologies (Baumrind, 1966): *authoritative*, *authoritarian* and *permissive*. The *authoritative* dimension includes the warmth/involvement, reasoning/induction and tolerance subscales (Cronbach’s $\alpha = 0.80$ and 0.82 for mothers and fathers, respectively). The *authoritarian* dimension includes the verbal hostility, corporal punishment and punitive strategies subscales (Cronbach’s $\alpha = 0.70$ and 0.71 for mothers and fathers, respectively). The *permissive* dimension includes the lack of follow through, ignoring misbehaviour and (lack of) self-confidence subscales (Cronbach’s $\alpha = 0.70$ and 0.44 for mothers and fathers, respectively). High scores on one of these dimensions indicate that parents are more authoritative, more authoritarian or more permissive and vice versa. Due to the low Cronbach’s alpha score obtained for fathers in the permissive dimension, a PCA of the PSDQ subscales was performed to obtain the parenting variables used in the analyses.

2.3.3 | Overparenting scale

Mothers and fathers completed the Anticipatory Problem Solving (APS) subscale of the Overparenting Scale (Segrin et al., 2012) separately. This instrument measures the degree to which fathers and mothers solve their children’s problems providing them with tangible assistance or removing obstacles for them. This subscale has 12 items (Cronbach’s $\alpha = 0.85$ for mothers and 0.82 for fathers) scored on a Likert-type scale ranging from (1) “strongly disagree” to (5) “strongly agree” (e.g., *I try to solve problems for my child before she/ he even experiences them*). High scores on this subscale indicate excessive parental involvement, and vice versa.

2.3.4 | Children’s behaviour questionnaire

The Spanish version of the short form of the Children’s Behaviour Questionnaire (CBQ; Rothbart et al., 2001) was used to measure children’s temperament. This questionnaire contains 36 items scored on a Likert-type scale ranging from (1) “extremely false” to (7) “extremely true”, and in our study, it was completed jointly by parents. Items are classified into three dimensions of temperament: surgency, negative affect and effortful control. In the present study, only the surgency dimension was contemplated. This dimension includes impulsivity, high intensity pleasure, activity level and shyness (Cronbach’s $\alpha = 0.71$; e.g., *He/she seems always in a big hurry to get from one place to another*, *He/she likes going down high slides or other adventurous activities*). High scores on these temperament dimensions indicate high levels of surgency, negative affect and effortful control (respectively), and vice versa.

2.3.5 | Peer estimated conflict behaviour

Children completed the Peer Estimated Conflict Behaviour questionnaire (PECOBE, Björkqvist & Österman, 1995) individually, reporting physical, verbal and indirect aggression levels for each of their classmates. Response options range from (0) “never” to (4) “very often” (e.g., *who hits, kicks, trips or pushes others? who yells, insults, calls names and teases others? and who gossips, spreads false stories, says bad things behind the other’s back, and tries to get others to dislike the person and shut them out of the group?*). A total of 14 different class groups (containing differing numbers of children) took part in this study. The final score used for each subject was calculated on the basis of each child’s mean score in all three types of aggression (physical, verbal and indirect), evaluated using this questionnaire. Finally,

due to the differential proportion of children in each class, these scores were standardized twice in accordance with the method proposed by Cillessen and Marks (2017) in order to correct for differences in classroom size. Next, a PCA was conducted. High scores in any of these dimensions indicate children with high levels of physical, verbal and indirect aggression, respectively, and vice versa.

2.3.6 | Behaviour assessment system for children

Parents (fathers and mothers) and teachers reported information about their offspring and students, respectively, by completing the Aggression subscale of the Behaviour Assessment System for Children (BASC P-2/T-2, Reynolds & Kamphaus, 2004; Spanish adaptation, González et al., 2004). The teachers' questionnaire (T-2) includes 149 items and the parents' questionnaire (P-2; answered jointly by both parents) includes 134 items. Both versions are scored on a Likert-type scale ranging from (A) "never" to (D) "almost always". In the present study, only the Aggression subscale of the two questionnaires was used (Cronbach's $\alpha = 0.79$ and 0.93 , for parents and teachers, respectively).

2.4 | Variables

The short version of the PSDQ (Robinson et al., 2001) has been used in many cultures, and differences have been observed between English-speaking samples and those from other cultures in the south of Europe (which is where our participants came from) in relation to the permissive dimension (Calafat et al., 2014; Di Maggio & Zappulla, 2014; Fuentes et al., 2015; Gracia et al., 2012). In light of the above and due to the low Cronbach's alpha scores obtained in this dimension by the fathers in our sample, we decided to carry out two Principal Component Analyses (PCA; Varimax rotation with Kaiser) in order to obtain parenting dimensions for mothers and fathers separately. In these analyses, we used: (1) the scores obtained in the different PSDQ subscales by mothers; and (2) the scores obtained in the different PSDQ subscales by fathers. These analyses resulted in two identical five-factor models, one for mothers (78.76% of variance) and one for fathers (78.93% of variance). All the items included in each factor had a value of 0.61 or over. For both mothers and fathers, the first factor included the warmth/involvement, reasoning/induction and tolerance subscales and was called *warmth/induction* (32.98% of the variance observed for mothers and 34.43% for fathers). The second factor, *inconsistency*, included the lack of follow through and (lack of) self-confidence subscales (18.22% of the variance for mothers and 16.1% for fathers). The third factor, *hostility*, included the verbal hostility and corporal punishment subscales (11.78% of the variance for mothers and 10.96% for fathers). The fourth factor, *coercion*, (8.58% and 8.04% of the variance for mothers and fathers, respectively), included the punitive strategies subscale. The last factor, labelled *indulgence*, included the ignoring misbehaviour subscale (7.20% and 9.40% of the variance for mothers and fathers, respectively). The scores obtained on the APS subscale were standardized.

Another Principal Component Analysis (PCA; Varimax rotation with Kaiser) was performed using the aggression scores (standardized mean scores) reported by families, teachers and peers. This analysis resulted in a one-factor model that explained 62.02% of the variance and was called *aggression*.

Taking all the above into account, maternal and paternal practices and anticipatory problem solving were used as predictive variables; the direct and moderating effects of sex and surgency were studied; and aggression was used as the criterion variable.

2.5 | Data analyses

Statistical analyses were conducted using IBM SPSS Version 22.0. The Kolmogorov–Smirnov test was used, and we normalized those variables that were not normal using Blom's formula (Blom, 1958). Correlations

between the different study variables were analysed using the Pearson coefficient to identify possible relationships between assessed variables in order to include them, where appropriate, as covariables in the main analyses.

This study was divided into two different and consecutive stages: an initial exploratory analysis stage and a second confirmatory analysis stage. The exploratory stage aimed both to determine which parenting \times surgency interactions were eligible for inclusion in the second stage (the confirmatory model) and to increase our existing knowledge about surgency since most of the research to date has focused on analysing the impact of negative affect or effortful control on children's behaviour, whereas surgency has been much less studied.

Both analyses were conducted in the same way. Following the procedure suggested by Aiken and West (1991) and Lengua (2008), a series of multiple hierarchical regression analyses (enter method) were carried out to study the moderating role of child temperament and sex in the relationship between family variables and aggressive behaviour. Moreover, following Belsky and Widaman (2018), we analysed all those interactions with an F ratio of >1.0 and p -values of $p < 0.20$.

Due to the sample size, the number of variables studied and the findings reported in the extant literature indicating a possible differential influence of paternal and maternal parenting styles, the analyses described above were conducted separately for fathers and mothers. The tables show the results of both the exploratory and confirmatory analyses, presenting only those interactions that were found to be feasible.

Finally, to determine which theoretical model could explain the possible moderating effects detected (Diathesis-Stress, Differential Susceptibility or Vantage Sensitivity), the techniques described by Roisman et al. (2012) and Preacher et al. (2006) were used to examine the regions of significance (RoS) of the moderator (RoS on Z) and predictor variables (RoS on X), as well as to calculate the Pol. To analyse the slopes of the regression lines pertaining to the interaction between the predictor variables and the criterion variable, we estimated the low and high values of the moderator (± 1 SD). Following the procedure proposed by Roisman et al. (2012), we also tested the crossing of the interaction in the range of ± 2 SD from the mean of the predictor variable.

Next, to determine whether the data obtained fit the Differential Susceptibility, Diathesis-Stress or Vantage Sensitivity model, we analysed the Pol. According to Roisman et al. (2012), a case fitting the Differential Susceptibility model would have a Pol value of between 0.40 and 0.60; a case fitting the Diathesis-Stress model would have a Pol value very close to 0.00; and a case fitting the Vantage Sensitivity model would have a Pol value of approximately 1.00. We also analysed the PA index to assess the proportion of the sample that was differentially affected by the moderator. A case fitting the Differential Susceptibility model would have a PA value of around 50%, whereas in a case fitting the Diathesis-Stress model, this value would be around 0%.

The figures showing the moderating effects detected were compiled using the open access web program developed by Chris Fraley, available at <http://www.yourpersonality.net/interaction/> (Fraley, 2020).

3 | RESULTS

Table 1 shows the descriptive statistical values of the different variables considered in the present study.

Correlations among parenting practices (both parents), children's temperament and children's aggression are shown in Table 2. Paternal hostility and indulgence were positively associated with children's aggression, as were maternal inconsistency and hostility. In both cases (maternal and paternal parenting), children's sex and surgency correlated with children's aggression. No significant correlations were observed between the sociodemographic variables (child's age, number of siblings, parents' education level, parents' age and parents' employment situation) and the criterion variable (aggression). Consequently, the regression analyses carried out did not include these as covariables.

TABLE 1 Statistical descriptive details of variables studied

		N	M	SD	Standard error	95% Confidence interval for mean		Min.	Max.
						Lower bound	Upper bound		
Surgency	Boy	96	.108	1.106	.113	-.116	.332	-3.174	2.611
	Girl	105	-.099	.886	.086	-.270	.073	-2.595	2.129
	Total	201	.000	1.000	.071	-.139	.139	-3.174	2.611
Warmth/ Induction (M)	Boy	92	-.059	1.033	.108	-.273	.155	-3.117	1.265
	Girl	107	.051	.973	.094	-.135	.238	-3.218	1.434
	Total	199	.000	1.000	.071	-.140	.140	-3.218	1.434
Inconsistency (M)	Boy	92	-.020	.935	.098	-.214	.174	-1.934	2.781
	Girl	107	.0174	1.056	.102	-.185	.220	-1.932	3.685
	Total	199	.000	1.000	.071	-.140	.140	-1.934	3.685
Hostility (M)	Boy	92	.127	1.142	.119	-.109	.364	-2.066	4.719
	Girl	107	-.109	.850	.082	-.272	.054	-1.611	2.103
	Total	199	.000	1.000	.071	-.140	.140	-2.066	4.719
Coercion (M)	Boy	92	.021	.915	.095	-.169	.211	-1.863	4.493
	Girl	107	-.018	1.071	.104	-.223	.187	-2.083	6.431
	Total	199	.000	1.000	.071	-.140	.140	-2.083	6.431
Indulgence (M)	Boy	92	.097	1.174	.122	-.146	.340	-1.533	3.724
	Girl	107	-.083	.818	.079	-.240	.073	-1.429	2.450
	Total	199	.000	1.000	.071	-.140	.140	-1.533	3.724
APS (M)	Boy	95	.142	1.018	.104	-.066	.349	-2.208	2.239
	Girl	105	-.128	.971	.095	-.316	.060	-2.231	1.976
	Total	200	.000	1.000	.071	-.139	.140	-2.231	2.239
Warmth/Induction (F)	Boy	90	.174	.930	.098	-.020	.369	-2.750	1.482
	Girl	99	-.159	1.039	.104	-.366	.049	-3.448	1.500
	Total	189	.000	1.000	.073	-.143	.143	-3.448	1.500
Inconsistency (F)	Boy	90	.069	1.065	.112	-.154	.292	-2.091	4.759
	Girl	99	-.063	.938	.094	-.250	.125	-1.957	2.202
	Total	189	.000	1.000	.073	-.143	.143	-2.091	4.759
Hostility (F)	Boy	90	.093	1.107	.117	-.139	.325	-2.033	2.859
	Girl	99	-.085	.889	.089	-.262	.093	-1.753	2.663
	Total	189	.000	1.000	.073	-.143	.143	-2.033	2.859
Coercion (F)	Boy	90	.025	1.077	.114	-.200	.251	-2.533	4.360
	Girl	99	-.023	.929	.093	-.208	.162	-1.584	3.289
	Total	189	.000	1.000	.073	-.143	.143	-2.533	4.360
Indulgence (F)	Boy	90	-.064	1.104	.116	-.295	.167	-2.523	4.572
	Girl	99	.058	.897	.090	-.120	.237	-2.007	2.603
	Total	189	.000	1.000	.073	-.143	.143	-2.523	4.572
APS (F)	Boy	90	.062	.954	.101	-.138	.262	-2.0433	2.202
	Girl	100	-.056	1.041	.104	-.262	.151	-2.4678	2.060
	Total	190	.000	1.000	.073	-.143	.143	-2.4678	2.202

TABLE 1 (Continued)

		N	M	SD	Standard error	95% Confidence interval for mean		Min.	Max.
						Lower bound	Upper bound		
Aggression	Boy	91	.448	1.048	.110	.230	.666	-1.576	3.155
	Girl	105	-.389	.773	.075	-.538	-.238	-1.701	1.829
	Total	196	.0000	1.000	.071	-.141	.141	-1.701	3.155

Abbreviations: APS, anticipatory problem solving; F, father; M, mother.

3.1 | Additive and moderating effects of temperament and parenting styles on children's aggression in the confirmatory model

Although sex was found to have a direct effect on children's aggression ($\beta = -0.750$, $p = 0.000$), in the case of mothers, no interactions were observed between this and the other variables, with surgency positively predicting aggression in both boys and girls ($\beta = 0.269$, $p = 0.000$). Moreover, maternal inconsistency, hostility and coercion had a direct effect on aggression in both sexes (Table 3; $\beta = 0.255$, $p = 0.000$; $\beta = 0.243$, $p = 0.000$; $\beta = 0.148$, $p = 0.018$, respectively). Although all possible interactions between surgency and the different parenting practices were studied in the exploratory model (Table 3), only maternal hostility \times surgency and maternal anticipatory problem solving (APS) \times surgency were found to be statistically significant ($\beta = -0.086$, $F > 1.0$, $p = 0.086$; $\beta = -0.144$, $p = 0.033$, respectively). Specifically, surgency was found to moderate the effect of maternal hostility and maternal anticipatory problem solving on children's aggression (maternal hostility \times surgency and maternal anticipation problem solving \times surgency).

The association between maternal hostility and aggression was significant for children with high and low levels of surgency ($\beta = 0.16$, $p = 0.014$; $\beta = 0.33$, $p = 0.000$, respectively) when maternal hostility was low ($\beta = 0.44$, $p = 0.001$), but not when maternal hostility was high ($\beta = 0.10$, $p = 0.280$). This suggests that children with high or low levels of this temperament trait are more vulnerable than others to the effect of low levels of maternal hostility on their aggression (Figure 2). However, these same children do not seem to benefit any more than others from the effect of high levels of maternal hostility. Furthermore, the PoI was 0.09 and the PA index was 0.001. Following the recommendations made by Roisman et al. (2012), who consider that a Diathesis-Stress model would have a PoI value very close to 0.00 and a PA index close to 0%, this effect could be said to fit this model. This moderating effect means that children with high and low levels of surgency (who are either shy and calm or impulsive and nervous) may engage in more inappropriate behaviours when their mothers' parenting is characterized by low hostility.

In contrast, the association between maternal anticipatory problem solving and aggression was only significant for children who had high levels of surgency ($\beta = -0.29$, $p = 0.001$) when maternal anticipatory problem solving was low ($\beta = 0.56$, $p = 0.000$), and was not significant for children with low levels of surgency ($\beta = -0.00$, $p = 0.982$) when maternal anticipatory problem solving was high ($\beta = -0.02$, $p = 0.881$). This suggests that individuals with high levels of this temperament trait may be more vulnerable than others to the effect of low levels of maternal anticipatory problem solving on children's aggression (Figure 3). Nevertheless, these same children do not seem to benefit more than others from the effect of high levels of maternal anticipatory problem solving. Furthermore, the PoI was 0.01 and the PA index was 0.031. Therefore, following the recommendations made by Roisman et al. (2012), who consider that a Diathesis-Stress model would have a PoI value very close to 0.00 and a PA index close to 0%, this effect could be said to fit this model. This moderating effect suggests that children with high levels of surgency who are very impulsive and nervous may need more

TABLE 2 Bivariate correlations between family variables, child temperament, sex and child aggression (Both parents)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex	-	.016	-.084	.116	-.073	.096	-.103	.055	.019	-.118	-.019	-.090	-.135	-.418*** (p = 0.000)
2. Child age (months)	.016	-	-.091	.085	.093	.104	-.029	-.048	.036	.003	-.035	.036	.055	-.020
3. Number of siblings	-.084	-.091	-	-.008	.152* (p = 0.031)	-.068	.103	-.014	.013	.113	-.031	-.010	-.037	.122
4. Level of education (P)	-.043	-.009	.048	-	.092	.118	-.038	.090	-.034	-.064	-.083	-.205** (p = 0.004)	-.292*** (p = 0.000)	-.054
5. Parents age	-.095	.042	.014	.170* (p = 0.015)	-	-.050	-.007	.115	-.039	-.037	-.003	-.095	-.047	-.092
6. Employment situation (P)	-.100	.058	.013	-.186** (p = 0.008)	-.019	-	-.049	-.071	.035	-.163* (p = 0.021)	.097	-.111	-.006	.067
7. Surgency	-.103	-.029	.103	.061	-.007	.021	-	.164* (p = 0.022)	-.050	.132	.091	-.011	.043	.287*** (p = 0.000)
8. Warmth/Induction	-.167* (p = 0.022)	.073	-.095	.082	.145* (p = 0.047)	-.208** (p = 0.004)	.047	-	.000	.000	.000	.000	.026	-.009
9. Inconsistency	-.066	.144* (p = 0.048)	-.004	-.022	.004	.008	-.096	.000	-	.000	.000	.000	.060	.209** (p = 0.004)
10. Hostility	-.089	.110	.141	-.039	-.084	.003	.128	.000	.000	-	.000	.000	.061	.272*** (p = 0.000)
11. Coercion	-.024	.008	.077	-.096	.042	-.199** (p = 0.006)	-.010	.000	.000	.000	-	.000	.095	.110
12. Indulgence	.061	.025	-.039	-.013	.058	.016	.064	.000	.000	.000	.000	-	.224*** (p = 0.002)	-.004
13. APS	-.059	.020	-.124	-.210** (p = 0.004)	.014	.069	.011	.126	.163* (p = 0.025)	.064	-.037	.148* (p = 0.043)	-	-.053
14. Aggression	-.418*** (p = 0.000)	-.020	.122	-.015	-.034	-.031	.287*** (p = 0.000)	.067	.072	.322*** (p = 0.000)	.091	.150* (p = 0.043)	-.010	-

Note: Bold indicates significant values. Sex Dummie 0 = boy, 1 = girl; Fathers below diagonal; Mothers above diagonal.

Abbreviations: APS, anticipatory problem solving; P, parents.

*p < 0.05;

**p < 0.01;

***p < 0.001.

TABLE 3 Maternal parenting practices, surgency/extraversion and child aggression in boys and girls

	Exploratory model						Confirmatory model					
	Collinearity statistics			Collinearity statistics			Collinearity statistics			Collinearity statistics		
	B	SE	Standardised β	ΔR^2	Tolerance	VIF	B	SE	Standardised β	ΔR^2	Tolerance	VIF
(Constant)	.391	.091			.400	.088						
Step 1 Sex	-.789	.130	-.395*** (p = 0.000)	.173*** (p = 0.000)	.834	1.199	-.750	.121	-.376*** (p = 0.000)	.173*** (p = 0.000)	.929	1.077
Step 2 Surgency	.337	.087	.342*** (p = 0.000)	.062*** (p = 0.000)	.456	2.191	.269	.061	.274*** (p = 0.000)	.062*** (p = 0.000)	.884	1.132
Step 3 Warmth/Induction	-.166	.089	-.169	.129*** (p = 0.000)	.435	2.297	-.014	.059	-.014	.129*** (p = 0.000)	.964	1.037
Inconsistency	.301	.095	.308** (p = 0.002)		.381	2.626	.255	.058	.261*** (p = 0.000)		.982	1.019
Hostility	.303	.096	.301** (p = 0.002)		.395	2.532	.243	.062	.242*** (p = 0.000)		.893	1.120
Coercion	.096	.122	.092		.260	3.847	.148	.062	.142* (p = 0.018)		.962	1.040
Indulgence	-.029	.080	-.029		.557	1.795	-.002	.061	-.002		.930	1.075
APS	-.138	.092	-.137		.430	2.328	-.146	.062	-.145* (p = 0.019)		.915	1.093
Step 4 Warmth/Induction \times Surgency	-.029	.101	-.029	.031	.351	2.852				.024* (p = 0.031)		
Inconsistency \times Surgency	.029	.089	.030		.413	2.424					.869	1.151
Hostility \times Surgency	-.134	.070	-.170 ^b		.449	2.225	-.086	.050	-.109 ^b			
Coercion \times Surgency	.118	.112	.106		.353	2.833						
Indulgence \times Surgency	.093	.087	.093		.476	2.099						
APS \times Surgency	-.150	.097	-.135 ^b		.471	2.123	-.144	.067	-.130* (p = 0.033)		.943	1.061

(Continues)

TABLE 3 (Continued)

	Exploratory model						Confirmatory model								
	B			SE			Standardised β			ΔR^2			Collinearity statistics		
	B	SE	Standardised β	ΔR^2	Tolerance	VIF	B	SE	Standardised β	ΔR^2	Tolerance	VIF			
Step 5	Warmth/Induction \times Sex	.316	.133	.228* ($p = 0.018$)	.024	2.577									
	Inconsistency \times Sex	-.090	.123	-.071		2.643									
	Hostility \times Sex	-.107	.141	-.067		2.192									
	Coercion \times Sex	.061	.147	.049		3.915									
	Indulgence \times Sex	-.001	.141	-.001		1.930									
	APS \times Sex	-.015	.135	-.011		2.683									
	Surgency \times Sex	-.199	.142	-.130 ^b		2.430									
Step 6	Warmth/Induction \times Surgency \times Sex	.066	.145	.045	.007	2.807									
	Inconsistency \times Surgency \times Sex	.035	.129	.024		2.218									
	Hostility \times Surgency \times Sex	.072	.134	.041		1.646									
	Coercion \times Surgency \times Sex	-.064	.159	-.040		2.761									
	Indulgence \times Surgency \times Sex	-.145	.144	-.084		1.938									
	APS \times Surgency \times Sex	.018	.151	.011		2.292									

Note: Bold indicates significant values; Results of the final regression model exploratory stage (F = 4.435, $p = 0.000$, $R^2 = 0.427$); Reference Category: Boys. Results of the final regression model confirmatory stage (F = 11.325, $p = 0.000$, $R^2 = 0.389$); Reference Category: Boys.

Abbreviation: APS, anticipatory problem solving.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

^bMagnitude of the F ratio > 1.0 and p -value < 0.20.

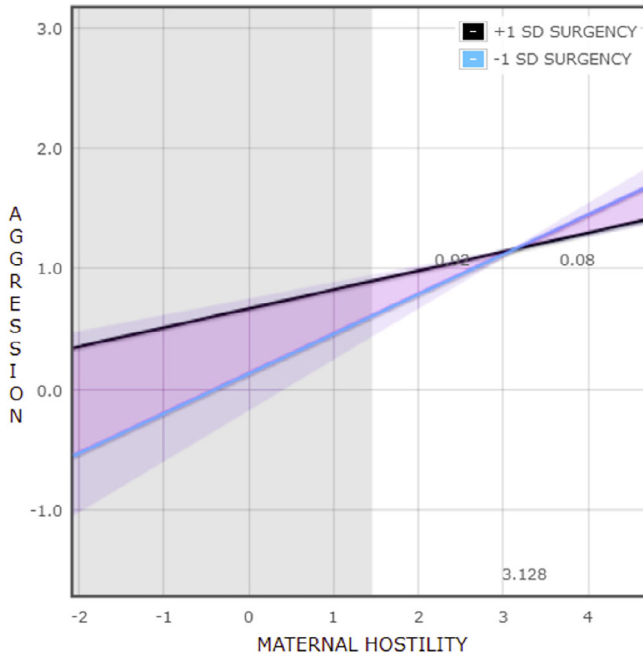


FIGURE 2 Maternal hostility \times Surgency

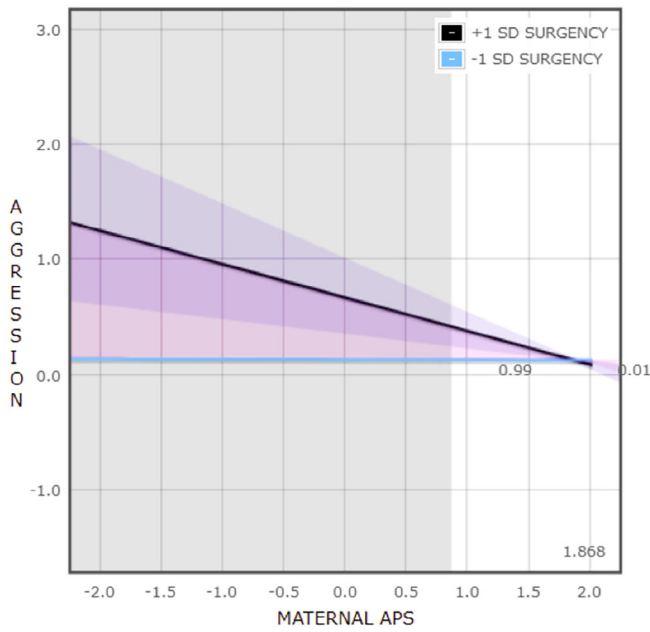


FIGURE 3 Maternal APS \times Surgency

TABLE 4 Paternal parenting practices, surgency/extraversion and child aggression in boys and girls

	Exploratory model					Confirmatory model						
	B	SE	Standardised β	ΔR^2	Collinearity statistics Tolerance VIF	B	SE	Standardised β	ΔR^2	Collinearity statistics Tolerance VIF		
(Constant)	.402	.105				.407	.095					
Step 1 Sex	-.792	.140	-.395*** (<i>p</i> = 0.000)	.181*** (<i>p</i> = 0.000)	.823	1.215	-.771	.127	-.385*** (<i>p</i> = 0.000)	.181*** (<i>p</i> = 0.000)	.931	1.074
Step 2 Surgency	.199	.103	.201	.054*** (<i>p</i> = 0.000)	.370	2.699	.191	.063	.193** (<i>p</i> = 0.003)	.054*** (<i>p</i> = 0.000)	.943	1.061
Step 3 Warmth/Induction	-.087	.105	-.087	.110*** (<i>p</i> = 0.000)	.359	2.786	-.004	.063	-.004	.110*** (<i>p</i> = 0.000)	.950	1.052
Inconsistency	.076	.098	.077		.411	2.435	.067	.063	.067		.936	1.068
Hostility	.309	.097	.306** (<i>p</i> = 0.002)		.436	2.294	.259	.063	.257*** (<i>p</i> = 0.000)		.964	1.038
Coercion	.095	.097	.094		.435	2.298	.095	.062	.094		.996	1.004
Indulgence	.097	.119	.097		.279	3.580	.173	.062	.173** (<i>p</i> = 0.006)		.972	1.029
APS	-.031	.131	-.030		.243	4.115	-.084	.065	-.082		.931	1.074
Step 4 Warmth/Induction × Surgency	.026	.112	.023	.015	.420	2.378				.008		
Inconsistency × Surgency	-.008	.082	-.010		.387	2.586						
Hostility × Surgency	-.021	.109	-.020		.373	2.683						
Coercion × Surgency	.142	.081	.157 ^b		.502	1.992	.083	.056	.093 ^b		.959	1.043
Indulgence × Surgency	.008	.120	.008		.278	3.591						
APS × Surgency	.024	.136	.022		.264	3.792						
Step 5 Warmth/Induction × Sex	.167	.139	.127	.009	.360	2.780						
Inconsistency × Sex	.038	.143	.026		.411	2.431						
Hostility × Sex	-.117	.145	-.075		.462	2.162						
Coercion × Sex	.008	.144	.005		.419	2.389						

TABLE 4 (Continued)

	Exploratory model				Confirmatory model							
					Collinearity statistics							
	B	SE	Standardised β	ΔR^2	Tolerance	VIF	B	SE	Standardised β	ΔR^2	Tolerance	VIF
Indulgence \times Sex	.092	.158	.060		.376	2.661						
APS \times Sex	-.060	.162	-.046		.263	3.801						
Surgency \times Sex	.013	.153	.008		.434	2.306						
Step 6 Warmth/Induction \times Surgency \times Sex	.083	.176	.047	.014	.405	2.469						
Inconsistency \times Surgency \times Sex	.023	.147	.016		.396	2.528						
Hostility \times Surgency \times Sex	.040	.169	.022		.467	2.143						
Coercion \times Surgency \times Sex	-.171	.147	-.113		.425	2.354						
Indulgence \times Surgency \times Sex	-.216	.170	-.130		.380	2.629						
APS \times Surgency \times Sex	.110	.183	-.073		.276	3.626						

Note: Bold indicates significant values. Results of the final regression model exploratory stage (F = 3.548, p = 0.000, R² = 0.384); Reference Category: Boys. Results of the final regression model confirmatory stage (F = 10.442, p = 0.000, R² = 0.353); Reference Category: Boys.

Abbreviation: APS, anticipatory problem solving.

*p < 0.01;

***p < 0.001.

^bMagnitude of the F ratio > 1.0 and p-value < 0.20.

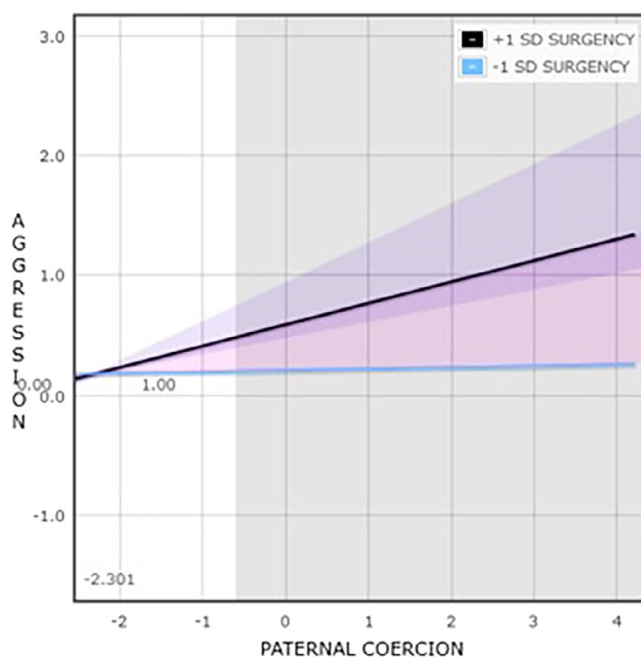


FIGURE 4 Paternal coercion \times Surgency

monitoring and guidance from their parents to help them control their impulsivity and, consequently, their inappropriate behaviour.

In the case of fathers (Table 4), sex and surgency were found to have a direct effect on children's aggression ($\beta = -0.771$, $p = 0.000$; $\beta = 0.191$, $p = 0.003$, respectively), although there were also some interactions between these variables and some of the parenting variables studied. Moreover, paternal hostility and indulgence were found to positively predict children's aggression ($\beta = 0.259$, $p = 0.000$; $\beta = 0.173$, $p = 0.006$, respectively). No three-way interaction was observed (Table 4) whereas a two-way interaction between paternal coercion and surgency ($\beta = 0.083$, $F > 1.0$, $p = 0.141$) was found.

This interaction was only significant for children with high levels of surgency ($\beta = 0.18$, $p = 0.035$) when paternal coercion was high ($\beta = 0.36$, $p = 0.005$). In contrast, this relationship was not significant for children with low levels of surgency ($\beta = 0.01$, $p = 0.886$) when paternal coercion was low ($\beta = 0.02$, $p = 0.844$). Moreover, the PoI was 1.00 and the PA index was 0.989. Therefore, following the recommendations made by Roisman et al. (2012), who consider that a Vantage Sensitivity model would have a PoI value very close to 1.00 and a PA index close to 1%, this effect could be said to fit this model. Children who are more impulsive, nervous and active seem to benefit more than others from the effect of high levels of paternal coercion on their aggression levels (Figure 4).

4 | DISCUSSION

The present study aimed to analyse the additive and moderating effects of certain maternal and paternal parenting practices and children's surgency and sex on their aggressive behaviour. Our results revealed that: (1) children's sex had a direct effect on their aggression (boys were significantly more aggressive than girls); (2) children's surgency predicted their aggression; (3) maternal inconsistency and coercion and paternal hostility and indulgence were

associated with children's aggression; (4) the main effects of surgency and parenting practices were not moderated by sex; (5) children's surgency moderated the effect of maternal hostility and anticipatory problem solving on children's aggression, with both effects fitting a Diathesis-Stress model and (6) children's surgency moderated the effect of paternal coercion on children's aggression, with this effect fitting a Vantage Sensitivity model.

Our findings confirm the large body of empirical evidence that attests to the existence of sex differences in aggressive behaviour (Archer & Côte, 2005; Murlidhar & Shastri, 2016). Of those factors that may explain why boys are more aggressive than girls, some authors highlight biological aspects, whereas others emphasize psychosocial ones (for a review, see Eisner & Malti, 2015).

Concerning the influence of parenting practices on children's aggression, hostility has been associated with the development of behaviour problems in childhood (see, for example, Fletcher & Johnston, 2016), with some authors suggesting that maternal hostility has a stronger and more negative effect than paternal hostility (Khaleque, 2017). Moreover, in our case, maternal coercion (non-physical punishment) also seemed to increase children's aggression. In this sense, Lansford (2010) pointed out that there is consensus regarding the adverse effects of physical and non-physical punishment in childhood and adolescence. Although it seems that more studies highlight a stronger effect of hostile and physical parental discipline, some evidence also exists of the harmful effects that non-physical punishments have on children (Ryder, 2017). It is possible that children who grow up in a hostile or coercive environment tend to copy their parents' behaviour and use it in other contexts (Smith et al., 2014).

Our results are consistent with those reported by other studies (Gryczkowski et al., 2010; Ruiz-Ortiz et al., 2017) regarding maternal inconsistency, which has been found to predict children's externalizing problems. It is likely that this type of parenting promotes insecurity and fear in children, prompting them to exhibit aggressive behaviour (Sierra et al., 2015). As a result of inconsistent rules established by mothers, children may have difficulty understanding what behaviour is right or wrong (Halgunseth et al., 2013).

In the present study, only paternal (not maternal) indulgence was associated with high aggression levels. Overall, parental indulgence seems to predict behaviour problems and disruptive or aggressive behaviour in childhood and adolescence (Clarke et al., 2014). Although the association between indulgent parenting and child development has been widely studied (Rehm et al., 2016), findings are not always consistent since this variable is often understood in different ways. For instance, indulgence has sometimes been viewed as parents giving their children more material goods than they need; other times, it refers to parents solving problems for their children when the latter could solve them themselves or having few expectations regarding their children behaving in a responsible manner (Cui et al., 2018). Moreover, few studies have sought to assess the influence of maternal and paternal indulgence on children's outcomes separately. In this sense, Chen et al. (2000) found that paternal—but not maternal—indulgence was significantly associated with children's behaviour problems. This may be due to the fact that maternal indulgence is perceived by children as a more normative behaviour, whereas fathers are expected to be less tolerant of their children's misbehaviour (Lee, 2014).

Our results also revealed a direct effect of children's surgency on their aggressive behaviour. Previous research into the influence of surgency on social adjustment is scarce and the results are contradictory (Dollar & Stifter, 2012). For instance, some authors have found that high levels of surgency are associated with externalizing problems in toddlers and preschool children (Gartstein et al., 2012), whereas others report beneficial effects of children's surgency on their social lives in adulthood (Herzhoff et al., 2017). In light of these contradictions, Rothbart and Bates (2006) suggested two types of surgency: one (related to a lack of shyness and a positive approach to new people and situations) that predicts prosocial behaviour and another (linked to impulsivity) that is related to maladaptive behaviour and aggression. It may also be that surgency has optimal levels that allow children to improve their social adjustment in specific contexts.

In our study, we observed a moderating effect of surgency on the association between some maternal and paternal parenting practices and children's aggression (specifically maternal hostility \times surgency, maternal anticipatory problem solving \times surgency and paternal coercion \times surgency). First, a moderating effect of surgency was observed on the association between maternal hostility and children's aggression, with children with high and low

levels of surgency seeming to be more vulnerable than others to the adverse effects of low levels of maternal hostility on their aggression levels. This interaction fits the Diathesis-Stress model since its PoI was 0.09 and its PA was 0.001, suggesting that both children who are impulsive and nervous and those who are shy, may need parents who use non-physical punishment to help them control their misbehaviour.

Second, our results revealed a moderating effect of surgency on the association between the absence/low levels of maternal anticipatory problem solving and children's aggression. This interaction fits the Diathesis-Stress model since its PoI was 0.00 and its PA was 0.031. Children with high intensity pleasure and high levels of activity probably tend to display more aggressive behaviour than their counterparts during the early years of their lives (Cui et al., 2016). It is also possible that, in middle childhood, children with high levels of impulsivity and aggressiveness need more intense parental monitoring to help them regulate their behaviour (Dollar & Stifter, 2012).

Although fathers' involvement in childrearing has increased over recent times, mothers still tend to be the principal caregivers (Gryczkowski et al., 2010). In this sense, some authors have suggested that, during childhood, maternal overprotection has a stronger effect on children's behaviour than paternal overprotection, whereas in adolescence, paternal overprotection seems to be the more influential of the two (Verhoeven et al., 2011). This may explain why, in middle childhood, children with high levels of surgency and extraversion need maternal (although not paternal) anticipatory problem solving to help them learn to control their misbehaviour. It has been suggested that the development of self-regulatory skills, such as effortful control and attention, may be helpful for redirecting angry or aggressive responses in surgent/exuberant children (e.g., Polak-Toste & Gunnar, 2006). Perhaps anticipatory problem solving reflects parents' tendency to "proactively regulate" their surgent children's behaviour in a way that may also mitigate this risk of aggression.

Finally, children's surgency was found to moderate the impact of paternal coercion on children's aggression, with this effect fitting the Vantage Sensitivity model. Children who are more impulsive, nervous and active seem to benefit more than others from high levels of paternal coercion, suggesting that the use of non-physical punishment by fathers may help improve aggressive behaviour among this group (Rioux et al., 2016; Ryder, 2017). The use of punitive strategies by fathers in response to children's maladjusted behaviour may promote better behavioural control among children, which in turn may benefit their behaviour and social adjustment. Moreover, although mothers have traditionally been considered the principal caregivers and seem to apply punishment more frequently than fathers, the fact that, in this case, children perceived their fathers (not their mothers) as the ones trying to correct their behaviour may prompt them to feel they are receiving more paternal attention than they are used to.

5 | CONCLUSIONS

The present study sought to explore how children aged 7–8 years vary in their sensitivity to parenting practices in accordance with their surgency levels. The findings reported here highlight the fact that, although parenting practices and children's temperaments are indeed linked to children's aggression, not all children are equally sensitive to these influences, with these differences depending on their temperament.

One of the strengths of the present study is its use of a multi-report procedure, with fathers, mothers, teachers and peers all reporting on children's aggression. Moreover, parents reported separately on their parenting practices and jointly on their child's temperament. Studying the different theoretical models that may explain the moderating effects of children's temperament on the association between parenting practices and child adjustment may help professionals predict how a child (boy or girl) with specific temperamental characteristics would respond to certain environmental stimuli. Likewise, this knowledge may be useful for developing prevention and intervention programs targeted at subjects with behavioural problems.

The present study has some limitations that should be taken into consideration. First, the design is cross-sectional rather than longitudinal, since all measures were taken in the second year of primary education. Second,

some authors have suggested that both favourable and unfavourable contexts and behavioural outcomes should be considered when studying possible differences in subjects' sensitivity to their environment (Slagt, Dubas, Deković, & van Aken, 2016). Although we took both positive and negative family contexts (for example, warmth and hostility, respectively) into account, we focused only on one outcome behaviour: aggression. In terms of the suggestion noted above, we assumed that positive development would be indicated by an absence of aggression.

Third, since parenting measures were obtained from self-reports, it is possible that parents were affected by social desirability bias when reporting on themselves. Another possible limitation is related to the measure obtained by the Parenting Styles and Dimensions Questionnaire (PSDQ). Our sample came from Spain, which is located in the south of Europe, and it should be noted that studies carried out in this region (Di Maggio & Zappulla, 2014; Fuentes et al., 2015) analysing relationships between first-order dimensions (authoritative, authoritarian and permissive parenting) and variables linked to psychological adjustment or maladjustment in children (for instance, behaviour problems) have not always confirmed the results reported by studies conducted with English-speaking samples. We therefore decided to perform a Principal Component Analysis using the PSDQ's subscales in order to determine how these second-order dimensions were organized in our sample of participants. Consequently, caution should be exercised when generalizing these results to other cultures.

Although our sample was not too small, future studies should seek to increase the number of participants in order to gain a more precise understanding of the influence of different levels of each temperament trait on children's outcomes. Moreover, it would have been helpful to have analysed the different components of surgency (impulsivity and extraversion) separately in order to explore the role of each in the associations between this variable, parenting styles and children's aggression. Finally, according to the information gathered in the sociodemographic questionnaire, the participants in this study came from a fairly normative population. For instance, most of the families were two-parent families with a medium or medium-high socioeconomic status.

Despite the limitations outlined above, our results suggest that the influence of surgency on the relationship between family and children's aggression may be different in middle childhood than in earlier stages of development. Although it seems that surgency remains fairly stable throughout an individual's lifespan, there is also evidence indicating the emergence of subtle changes in its structure across different developmental stages. In infancy, in addition to high intensity pleasure and a high activity level, surgency is reflected in smiling, laughing, approaching, vocal reactivity and perceptual sensitivity (Gartstein & Rothbart, 2003). In early childhood, this temperament trait begins to change to include impulsiveness and a lack of impulse control in addition to the aforementioned sociability indicators (Rothbart et al., 2001). In adolescence and adulthood, surgency is associated above all with extraversion, including the enjoyment of being with other people, social closeness and social skills to exercise leadership (Holmboe, 2016). These changes in this temperament trait are probably related to variations in its role as a moderator between family aspects and children's aggression across development.

The present study may provide information that leads to a better understanding of children's adjustment. Specifically, our results confirm high levels of surgency as a risk factor in middle childhood, particularly when there is no maternal follow-up of children's problems. Likewise, the results point to different risk factors in both maternal and paternal practices, highlighting the harmful effects of harsh discipline (hostility). These results may also help to identify possible new risk factors for the development of behaviour problems for study in further research and may prove useful for making decisions about the planning of preventive interventions.

Finally, longitudinal studies (including different components of surgency) are required to obtain evidence on the evolution of temperament markers in the transition from early to middle childhood, as well as on the long-term effects of parenting styles and temperament on children's aggression.

AUTHOR CONTRIBUTIONS

Rosa Ruiz-Ortiz: Conceptualization; formal analysis; investigation; methodology; writing – original draft. **Paloma Braza:** Conceptualization; investigation; methodology; writing – original draft. **Rosario Carreras:** Conceptualization;

investigation; methodology; writing – original draft. **José Manuel Muñoz Sánchez:** Conceptualization; methodology; writing – review and editing.

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CONFLICT OF INTEREST

All authors declare that they have no financial or other conflicts of interest concerning to the work presented.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1002/icd.2391>.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with Helsinki Declaration. Informed consent was obtained from all individuals included in the study.

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