# PRESCHOOL CHILDREN'S STRENGTHS AND DIFFICULTIES AS PREDICTORS OF URINARY CONTROL DIFFICULTIES

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## Abstract

Within a broad socio-emotional development of children of early and preschool age, some specific developmental tasks should be accomplished with the aim of successful overall children's development and well-being. One of the significant developmental tasks during that period is related to the adoption of basic hygiene habits and the control of urination. These developmental tasks are especially challenged within the transition periods in children's lives. During early and preschool developmental stage, diurnal or nocturnal urinary difficulties and bed-wetting could occur, which could consequently result in prolonged incontinences or enuresis in a certain number of children. Although there are a number of significant physiological correlates of successfully established bladder control, very few studies address the psychological correlates. They have shown a significant correlation between behavioral problems and significantly greater difficulties in establishing bladder control. Therefore, the primary objective of this study is to examine the relationship between diurnal urinary difficulties and bed-wetting with the psychological strength (prosocial behaviour) and difficulties (hyperactivity, emotional problems, behavior problems and peer problems) of preschool children, and to what extent it is possible to predict successful bladder control based on these psychological characteristics of children. Applying a general questionnaire on the adoption of urinary habits and the Strengths and Difficulties Questionnaire, 29 early childhood educators from six kindergartens evaluated 461 children (220 girls) with an average age of $M$ = 5 years ($SD$ = 1.17). Conducted correlation analyses showed significant positive correlations between diurnal urinary difficulties and all psychological difficulties, and a negative correlation between diurnal urinary difficulties and the strength of preschool children, i.e., prosocial behaviour. Significant predictors of diurnal urinary difficulties, both in the awake state and during daytime sleep, were shown to be the age of children, their conduct problems, and peer problems. Determined findings are discussed within the framework of practical implications in the work of early childhood educators with the aim of enhancing children's well-being by providing early childhood educators' support.

Keywords: Diurnal urinary difficulties and bed-wetting, early childhood education, preschool children, SDQ.

## 1 INTRODUCTION

The development of early and preschool-aged children involves a certain sequence of changes that take place within the child's characteristics, abilities, and behavior [1,2]. In order to understand the normal developmental pathway, it is important to be familiar with the pathological deviations from them, and vice versa, whereby insight is gained into the mechanisms and processes that underpin a child's development [3]. In line with the abovementioned, Sroufe [4] described the continuity of psychopathological development that relies on Bowlby's scheme, which metaphorically depicts developmental pathways. The scheme refers to the display of a tree whose branches show the path to positive adaptation and competence of a child or, conversely, to poor adaptation and disorders related to his or her development. In addition, dealing with environmental demands can be inefficient in a number of cases, with distractions that are defined as habit disorders. They relate to impaired initiative and early socialization, and include opposition with defiance and spite, obesity, eating disorders, and enuresis [2].

### 1.1 Urinary control difficulties in early and preschool-aged children

Urinary control difficulties, i.e. urinary incontinence present in early and preschool-aged children has been defined in a multitude of ways by many authors in the field of medicine, who begin by defining the

role and damage of the lower urinary tract. For this reason, terms such as incontinence, enuresis, and an overactive bladder have been used [5].

Authors in the field of nephrology note that the lower urinary tract dysfunction (LUTD) is present in 2% to 25% of children, and is associated with emotional and behavioral disorders [6]. Behavioral disorders include patterns of hostile, aggressive, or disruptive behavior that last for more than six months and are not consistent with the child's age. Night enuresis is one of them, and the authors state that it is among the more common disorders in preschool-aged children. Primary nocturnal enuresis occurs in 9% of children aged 5 to 10 years [7].

Urinary control difficulty or incontinence is defined as the involuntary leakage of urine, and can occur "continuously" or "intermittently." Intermittent incontinence is the discharge of urine in discrete quantities, and subgroups of intermittent incontinence are diurnal incontinence and enuresis [8]. From this, it is evident that urinary control difficulties in children of early and preschool age are mainly addressed in medical literature, in the field of urology, specifically pediatric urology (which addresses urinary control difficulties during childhood) [9].

Likewise, behavioral patterns of children with functional urinary control difficulties are less well known, and comorbidity is emphasized in most papers due to children's behavioral problems and personality disorders, and some even advocate psychiatric treatment [10]. However, during preschool age, psychological factors are not the cause but the consequence of the urinary control difficulties, so the treatment is recommended after age of five [11]. In addition, very often urinary control difficulties are the consequence of certain challenging situations in children's lives, such as some traumatic experiences or transitions, what should be taken into account when considering this early childhood issue [12,1,13,14].

A study carried out by Kodman-Jones and colleagues [15] found that a minority of children with infections and uncontrollable urinating during the day showed internalized behavioral problems (11% of participants) and constipation, and those without infections and uncontrollable urinating during the day showed a mixed style of psychological problems (35%). In contrast, children who urinated uncontrollably during the night tended to exhibit external behavioral problems (16%). Similarly, results indicated that children who did not have an infection or uncontrollably urinated during the day and those that did uncontrollably urinate during the night were more likely to exhibit symptoms of an attention-deficit disorder and hyperactivity than the general population. In addition, parents emphasize stubbornness and secrecy as the characteristics of children exhibiting uncontrollable urinating during the day, which has not been determined in children with uncontrollable urinating during the night.

## 1.2 Significant predictors of urinary control difficulties

Research conducted with the aim to identify predictors indicating urinary control difficulties has shown significant results. Specifically, in the study examining the psychological correlates associated with enuresis [16], it is highlighted that these are attracting increasing attention, which is related to a multifactorial approach to this issue [17]. The authors provided an overview of research preceding theirs, stating that they had been inconsistent and incomplete. It is precisely the intention of this research to contribute to the advancement of understanding that is focused on the socio-emotional functioning of children with urinary control difficulties. For this purpose, four dimensions were examined: attachment, self-control, self-confidence, and temperament. On the sample of 44 children (between the ages of 5 and 15), and twenty-two children (participants) had enuresis, the results showed that the children with enuresis showed significantly lower levels of secure attachment, higher levels of conduct problems, and lower levels of self-confidence than the control group.

In addition, the research conducted by Van Hoecke and colleagues [18] focused on internalized and externalized conduct problems in children with diurnal and nocturnal enuresis. Personality traits, internalized, and externalized problems occurring in children in the age range of six to twelve years with diurnal and nocturnal enuresis were described. A correlation was determined between personality traits and problems manifested in the child's behavior, and a comparison showed that the children with enuresis showed moderate to significant behavioral problems, higher levels of neuroticism, and lower levels of conscientiousness. Similar results were determined in the Croatian study [19].

In line with the aforementioned, Schaffer (1973; according to [18]) stated that certain psychological factors may cause enuresis to occur and are related to negative life events and temperament of the child. Furthermore, Kaffman and Elizur (1977, [18]) observed that temperament is an important factor during the development of nocturnal enuresis. They noted that there are two types of children with

developed enuresis at the age of four: those who show high levels of motor activity and aggression and those who show low levels of motivation for success.

A longitudinal study performed by Joinson et al. [20] found that there was evidence to suggest a correlation between psychological factors and uncontrollable urinating. The sample consisted of 8,769 children between the ages of four and nine, and the association was examined between severe childhood temperament and psychological problems with uncontrollable urinating in school age. The findings indicate a significant correlation between these variables.

Research focused on the development of bladder control between the ages of four and nine, and its relationship with the dimensions of maturation in children were conducted by Joinson and colleagues [21,22]. Based on parents' evaluations, the children's temperament and the mothers' psychopathology were examined, same as the correlation between different types of bed-wetting with certain factors at an early age. The results showed that severe temperament, slow-moving development, and exposure to mother's anxiety/depressive states were associated with greater odds of developing uncontrolled urination or relapse in children (indicating a return to a previous condition after a period designated as the "dry period").

In addition to the predictors mentioned above, weight gain is also associated with the risk of developing enuresis, as evidenced by Weintraub et al.'s [23] research findings. Obese children were found to be at an increased risk of uncontrolled urination, whose body mass index was within the parameters of an expected development.

# 2 RESEARCH AIM, PROBLEMS, AND HYPOTHESES

The primary objective of this research was to examine the relationship between DUCD (while awake and during sleep) with the psychological strengths and difficulties of preschool-aged children, and to what extent it is possible to predict successful control based on these psychological characteristics of children.

Based on the defined objective, the following research problems were posed: 1) Descriptive analysis will determine the incidence of DUCD as well as strengths and difficulties in early and preschool-aged children; 2) A correlation analysis will examine the relationship between DUCD and children's strengths and difficulties; and 3) A hierarchical regression analysis will identify significant predictors of DUCD.

Based on the theoretical models of the variables studied and the research conducted thus far, it is expected to: 1) determine a low incidence of diurnal DUCD, low levels of difficulties and higher levels of strength in children; 2) determine a significant positive correlation of DUCD with difficulties and a significant negative correlation with children's strength; 3) identify strength and difficulties as significant predictors of DUCD in children.

# 3 METHODOLOGY

## 3.1 Participants

The sample of participants consisted of 461 children (220 girls) assessed by their preschool teachers (29 preschool teachers from six kindergartens). The kindergartens were non-randomly selected in the Primorje-Gorski Kotar County: Kindergarten Hreljin from Bakar, Kindergarten Matulji from Matulji, Kindergarten Orepčići from Kraljevica, Kindergarten Pčelice, Kindergarten Bambi, and Kindergarten Škrljevo from Škrljevo. The average age of children was M = 5.00 years (SD = 1.17) ranging from 1.5 to 7.5 years.

## 3.2 Measures and procedure

Two measure have been applied in this study.

First, the questions that made up the *Scale of general information* focused on the frequency of uncontrollable urinating during the children's stay in the kindergarten (assessment from 0 to 7: *0 – rarely, almost never, or never, 1 – once a month, 2 – once a week, 3 – twice a week, 4 – three times a week, 5 – four times a week, 6 – every day of the week, and 7 – every day and more than once*) and during sleep (assessment from 0 to 6: *0 – rarely, almost never, or never, 1 – once a month, 2 – once a week, 3 – twice a week, 4 – three times a week, 5 – four times a week, 6 – every day of the week*). In addition

to these two questions, the preschool teachers indicated whether a child had a greater body weight than their peers on a scale of 1 to 3 (*1 – no, 2 – moderately, and 3 – significantly greater weight*).

Second, the Strenghts and Difficulties Questionnaire (*SDQ*; [24]) is designed to assess the behavioral and emotional strength and difficulties of preschool children and adolescents. The SDQ questionnaire is used for clinical purposes as an initial assessment of parents, teachers, and young people. The questionnaire contains 25 items divided into five subscales: prosocial behavior, hyperactivity, emotional problems, conduct problems, and peer problems. Each subscale contains five items. Higher scores on the hyperactivity subscale, emotional, conduct, and peer problems indicate higher levels of difficulties except for the prosocial behavior subscale, whose increase indicates a higher level of positive behaviour. i.e. strength. The survey used the version R 4-16 of the SDQ questionnaire in which the preschool teacher's task was to assess the statement pertaining to an individual child on a scale of 1 to 3 (1 – *incorrect*, 2 – *partially true*, 3 – *completely true*). The reliability coefficient (Cronbach alpha) obtained in this research for prosocial behavior is $\alpha_{(PRO)}$=0.822, for hyperactivity $\alpha_{(HYP)}$=0.839, for emotional problems $\alpha_{(EP)}$=0.734, for conduct problems $\alpha_{(CP)}$=0.781, and for peer problems $\alpha_{(PP)}$=0.634, what confirmed prior study findings [25,26].

The Faculty of Teacher Education in Rijeka contacted the kindergarten principals with a formal letter, and then the preschool teachers, who agreed to participate in the study. The teachers were instructed to assess the children in such a way that they entered the code of each child they were assessing, thus satisfying the criterion of anonymity and confidentiality of information. The period to which the assessments related were set at six months. The preschool teacher' assessment lasted one week, after which the assessment lists were submitted to the examiners. After thanking them for their participation in the research, the preschool teachers were informed how they would be familiarized with the research results. The SPSS 20 computer program was used to process the results.

# 4 RESULTS ND DISCUSSION

## 4.1 Descriptive analysis of diurnal urinary control difficulties (DUCD) and the strength and difficulties of children

In order to determine the frequency and incidence of uncontrollable urinating in the assessed preschool children, arithmetic means with standard deviations with ranges were determined (Table 1). Also, the same table shows an average assessment of all the difficulties and strengths of children assessed by the preschool teachers. With regards to the first research task, a low incidence of DUCD, lower levels of difficulties, and higher level of strength in children were identified. Using the *Scale of general information*, lower assessed values of DUCD during sleep were found than in the case of DUCD in the awake state.

Descriptive data obtained on the Strengths and Difficulties Questionnaire (SDQ) were similar to those obtained in the research by Gao and colleagues [27] on a sample of children aged five to 13 years, showing also that difficulties decrease and strengths of children increase with increasing age.

*Table 1. Descriptive statistical parameters (M, SD, Range) for DUCD in the awake state and during sleep, and SDQ-dimensions (prosocial behavior, hyperactivity, emotional problems, conduct problems, and peer problems)*

| | *M* | *SD* | *Range* |
|---|---|---|---|
| ***DUCD in the awake state*** | 0.29 | 1.22 | 0-7 |
| ***DUCD during sleep*** | 0.34 | 1.22 | 0-6 |
| ***Prosocial behavior*** | 2.52 | 0.48 | 1-3 |
| ***Hyperactivity*** | 1.68 | 0.57 | 1-3 |
| ***Emotional problems*** | 1.24 | 0.36 | 1-3 |
| ***Conduct problems*** | 1.42 | 0.48 | 1-3 |
| ***Peer problems*** | 1.22 | 0.31 | 1-3 |

## 4.2 Relationship between DUCD and the strengths and difficulties of children, and the possibility of predicting DUCD

As hypothesized, a statistically significant positive correlation was found between DUCD and difficulties: hyperactivity, emotional, conduct, and peer problems, and a significant negative correlation between DUCD and children's prosocial behavior (Table 2).

***Gender.*** There is no significant correlation determined between gender and DUCD. Gender was found to be significantly more positively correlated with prosocial behaviour, with girls being assessed as showing significantly more prosocial behavior than boys. In addition, significantly higher assessments of hyperactivity and conduct problems were found in boys than in girls. Identified significant correlations confirm the findings of previous research [28].

***Age.*** There is a significant negative correlation between age and DUCD. This means that older children have significantly less difficulty in urinating during sleep and in the awake state, what had been expected. The determined significant correlations between age and strength and difficulties revealed that the older the children are, the significantly more pronounced the prosocial behavior and the significantly fewer the reported difficulties. Developmentally, these findings are expected since with greater age there is a significant development of self-regulation, social skills, self-awareness of oneself and others, and emotional maturation [29].

*Table 2. Correlation matrix of DUCD in the awake state and during sleep, gender, age and SDQ-dimensions (prosocial behavior, hyperactivity, emotional problems, conduct problems, and peer problems)*

| | ***DUCD during sleep*** | ***Gender*** | ***Age*** | ***Prosocial behavior*** | ***Hyperactivity*** | ***Emotional problems*** | ***Conduct problems*** | ***Peer problems*** |
|---|---|---|---|---|---|---|---|---|
| ***DUCD in the awake state*** | **.897**** | -.039 | **-.469**** | **-.279**** | **.146**** | **.213**** | **.237**** | **.314**** |
| ***DUCD during sleep*** | 1.00 | -.057 | **-.463**** | **-.273**** | **.150**** | **.206**** | **.240**** | **.304**** |
| ***Gender*** | -.057 | 1.00 | .031 | **.230**** | **-.307**** | .081 | **-.150**** | -.016 |
| ***Age*** | **-.463**** | .031 | 1.00 | **.252**** | **-.194**** | **-.142**** | **-.139**** | **-.219**** |

**p<0,05; **p<0,01*

***DUCD in the awake state and during sleep***. A significant positive correlation was found between the variables DUCD in the awake state and during sleep. This means that those children with DUCD in the awake state are more likely to have problems with urinating during sleep, which is to be expected. Furthermore, a significant negative correlation was found between the DUCD in the awake state and during sleep with Prosocial behaviour, i.e. children who urinate in the awake state and during sleep are assessed as having significantly less prosocial behavior than children who do not. On the other hand, the same children are evaluated as those who exhibit significantly higher levels of hyperactivity, emotional problems, conduct problems and peer problems.

The findings also support the findings of other authors who describe the incidence of lower urinary tract dysfunction in 2% to 25% of children; this is associated with emotional difficulties and behavioral disorders, i.e., hostile behavior, aggressive, and disruptive behavior, which lasts longer than six months [6]. Furthermore, Kodman-Jones and colleagues [15] found that a minority of children who have infections and uncontrollably urinate during the day show internalized behavioral problems and, in contrast, children who uncontrollably urinate during sleep show external behavioral problems and more often symptoms of an attention deficit disorder and hyperactivity.

Finally, two hierarchical regression analyses were performed to verify and predict the difficulty of uncontrolled urination during sleep and in the awake state in children, and the results are visible in Table 3. In accordance with the results of the correlation analysis described above, similar results were found for the possibility of predicting DUCD, both in the awake state and during sleep, with respect to predictors of gender, age, and SDQ dimensions. An insight into Table 3 shows that, based on the first model, age is a significant predictor of DUCD in the awake state, explaining 22% of the variance of the criterion variable. Compared to both models, which included gender, age, and all SDQ dimensions, age and two SDQ dimensions as predictors, conduct problems and peer problems, accounted for 29% of the variance

in DUCD in the awake state. Very similar to the findings of significant predictors of the criterion variable of DUCD during sleep, significant determinants of the criterion variable of DUCD during sleep were identified. In the first model, age also proved to be a significant predictor, explaining 22% of the variance of the second criterion variable. In the second model, age and the same SDQ dimensions as in the first criterion variable, conduct and peer problems, proved to be significant predictors explaining 28% of the variance of the second criterion variable. Thus, the hypotheses of this research were confirmed with respect to age and two SDQ dimensions, conduct problems and peer problems, which were found to be significant predictors of DUCD both in the awake state and during sleep.

*Table 3. Results of two Hierarchical regression analyses for criteria of DUCD in awake state and during sleep with two models (first: gender and age as predictors; and second: gender, age, prosocial behaviour, hyperactivity, conduct problems, conduct problems, and peer problems as predictors)*

| | | | *B* | *Beta* | $R^2$ | *F (df)* |
|---|---|---|---|---|---|---|
| *DUCD IN THE AWAKE STATE - CRITERIA* | Model 1 | Constant | 2.861 | | **.224**** | **63.933** (2, 444)** |
| | | Children's gender | .058 | -.023 | | |
| | | Children's age | -.497 | **-.472**** | | |
| | Model 2 | Constant | 1.682 | | **.290**** | **8.153** (5, 439)** |
| | | Children's gender | -.049 | -.020 | | |
| | | Children's age | -.438 | **-.416**** | | |
| | | Prosocial behavior | -.108 | -.043 | | |
| | | Hyperactivity | -.192 | -.089 | | |
| | | Emotional problems | .113 | .033 | | |
| | | Conduct problems | .365 | **.142**** | | |
| | | Peer problems | .663 | **.167**** | | |
| *DUCD WHILE ASLEEP - CRITERIA* | Model 1 | Constant | 2.955 | | **.220**** | **56.429** (2, 401)** |
| | | Children's gender | -.083 | -.034 | | |
| | | Children's age | -.502 | **-.466**** | | |
| | Model 2 | Constant | 1.648 | | **.284**** | **7.108** (5, 396)** |
| | | Children's gender | -.065 | -.026 | | |
| | | Children's age | -.446 | **-.413**** | | |
| | | Prosocial behavior | -.077 | -.031 | | |
| | | Hyperactivity | -.134 | -.063 | | |
| | | Emotional problems | .109 | .033 | | |
| | | Conduct problems | .347 | **.137**** | | |
| | | Peer problems | .639 | **.165**** | | |

*Gender: M=1; F=2*
**p<0.05; **p<0.01*

## 5 CONCLUSIONS

The aim of this quantitative study was to examine the relationship between DUCD (in the awake state and during sleep) with psychological strengths and difficulties of preschool-aged children. Furthermore, the aim was also to predict the extent to which certain variables influence the successful control of children's psychological characteristics.

Considering the results and the research performed thus far, it has been determined that the levels of strength are assessed significantly higher and the levels difficulty of preschool children are assessed significantly lower. In relation to gender and age, previous findings have been confirmed. A significant increase in strength and a significant decrease in difficulties is developmentally expected. Regarding significant correlations with gender, although the findings confirm those of previous research, the issue of examiners' gender remains open, suggesting that future research use assessments made by male examiners to test the effect of the examiner in assessing the strengths and difficulties of preschool-aged children.

Expected significant correlations were found between DUCD in the awake state and during sleep with all SDQ dimensions, confirming the presumed conditionality of DUCD with children's psychological characteristics. Finally, age, conduct problems, and peer problems proved to be significant predictors of DUCD, both in the awake state and during sleep, given that they also showed the highest correlations. These findings should also be considered in terms of the limitations of the research, which did not use a random sample. In addition, as noted above, all assessors were female preschool teachers, and some other assessor characteristics were not controlled, such as seniority, educational background, and the like. Also, the research did not control the variable of children with disabilities, which should certainly be taken into account.

However, regardless of the limitations of the research that should be taken into account when creating guidelines for future research, given that there is no similar research in our country and the relatively large sample of children covered in this research, it can be concluded that children with DUCD, either in the awake state or during sleep, also exhibit significantly less prosocial behavior and significantly more difficulties in the areas of greater hyperactivity, emotional, conduct, and peer problems. Therefore, the practical implications are significant since pedagogical influences on some behaviors in children can also be affected by DUCD. The findings identified were expected, and a real challenge in future research will be to try to answer the question of the cause-effect relationship of SDQ dimensions and DUCD, as well as the question of the possible interaction effects of these focal variables, and their relationship with children's gender and age.

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