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Shyness x Niche Interactions Across Five Countries: A Mixed-Methods Exploratory Study

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Shyness x Niche Interactions Across Five Countries: A Mixed-Methods
Exploratory Study

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Master of Arts Thesis

Shyness x Niche Interactions Across Five Countries: A Mixed-Methods Exploratory Study

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Shyness x Niche Interactions Across Five Countries: A Mixed-Methods Exploratory Study

Children's daily activities have important implications for their overall development. Larson and Verma (1999) refer to the various contexts that children spend time in as experiential niches, and it is suggested that greater time spent in a context and activity is associated with increased proficiency in that context and activity. In particular, children's play is an activity that can have a variety of benefits (see Milteer et al., 2012 for review). While physical play is thought to be beneficial for children's health, Burdette and Whitaker (2005) made the case that play can also have benefits to children's cognitive attention, affiliation with peers, and affect. Aspects of children's pretend play have been found to be correlated with children's creativity in terms of divergent thinking and storytelling (Hoffmann & Russ, 2012). These are just a few examples of the variety of benefits for children's development that can be attributed to playing. Another large area of research exhibiting developmental benefits is the literature on play-based therapy for children.

Since children's play has been linked to a variety of benefits, it is important to assess the factors that structure and regulate children's play experiences. The issue, however, is that there are a variety of factors that can contribute to children's play, attributed to both characteristics of the child and their environment. Shyness is one such child characteristic that can be associated with play. But the interactions among shyness and the environment in producing variations in play is a topic that warrants investigation. To address this topic, the current study utilized the Developmental Niche framework (Super & Harkness, 1986), which viewed children's development through the interactions among the child and the niche's three subsystems of everyday physical and social settings, customary practices of childrearing, and caretaker psychology, which are all influenced by the overarching cultural context.

Literature Review

Physical and Social Settings of Play

Types and outcomes of play can vary according to which context play occurs in. Physical settings would include the home, school, park, backyard, neighborhood, and more. At the same time, the individuals that are present and engaged with the child during play may also be considered as social settings. In some instances, the physical and social settings overlap. Veitch et al. (2010) found that parents were likely to report their children to play regularly in the neighborhood, the more friends their child had in the neighborhood. From this example we could infer that when the children were playing outside, they were also playing with other children in the neighborhood at the same time. Shim et al. (2001) found that two to five-year-old children's peer play differed depending on whether they played outside or inside at child care. For one last example, the settings with the highest proportion of Australian parents reporting their child playing during free time after school and on the weekends were in the yard at home, in the street, and in open public spaces like a park (Veitch et al., 2006).

Customs and Practices of Childcare for Children's Play

Another important consideration for understanding variation in children's play is the practices used to regulate children's opportunity for play. Within a cultural context, play can be emphasized as developmentally important for children- leading to opportunities for play through several institutions for childcare and education. One of the most obvious examples can be seen in children's schools, and there is often debate about the relevance of play to school and learning. For example, Gunnarsdottir (2014) discussed how the schoolification of early childhood education and care may push aside play-based learning approaches typically used in Iceland. Contemporary news articles and journalism reports can be seen discussing the relevance of play

to the school context. A somewhat recent Time.com article written by Siobhan O'Connor in 2017 discussed the decrease of children's free play in the school context and in general, and the benefits of free play (O'Connor, 2017). The point of these few examples being that ideas about play as it relates to child development can be seen and implemented in policy, educational institutions, and media, among other institutions. More relevant to this study, parenting practices related to children's play are also viewed through this subsystem of the niche. But when it comes to parenting practices, we must first understand the implicit ideas and beliefs that parents have about children's play, which influence their practices.

Caretaker Psychology and Children's Play

Caretaker psychology has an impact on the types of play that children engage in, and parental involvement in play. Manz and Bracaliello (2016) found that higher levels of importance that Spanish and English-speaking U.S. parents ascribed to children's play, as related to children's development, was associated with higher parental involvement in toddler's play and learning activities. The caretaker psychology also shapes the physical and social settings of play. Veitch et al. (2006)'s qualitative studies with Australian parents revealed six themes elaborating on their perceived influences of where their children played: the child's safety, the child's independence, the child's preferences, the availability of peers, play equipment available at public spaces, and environmental factors. And it has been found that children were less likely to play outside in their yard at home on the weekend when their parent had less of a preference for their child's engagement in physical activities (Veitch et al., 2010). This may be linked to another study's findings of which parents believed outdoor play was important for children, but that they were also nervous about providing outdoor risky play for their children and being a helicopter parent (McFarland & Laird, 2018). In the context of social settings, StGeorge et al.

(2018)'s semi-structured mother and father interviews revealed that father and son rough-and-tumble play was viewed by parents as having a number of positive outcomes but that it was also important to set rules and boundaries for rough-and-tumble play as it could also lead to negative outcomes as well, like antisocial behaviors.

Play Across Cultural Contexts

Studies have found cultural differences in types of play (Cote & Bornstein, 2005), daily time in play and other activities (Harkness et al., 2011), and parent-child play (Suizzo & Bornstein, 2006; Parmar et al., 2008)- for a few examples. Under the Developmental Niche framework, we can explain these cultural differences as the wider cultural context directly influencing the subsystems of the niche. This can be more easily understood by returning to the discussion of play settings and parental beliefs from earlier. An in-depth literature review of culture and parent-child play in Roopnarine and Davidson (2015) highlighted the place of play and parent-child play in the context of a variety of children's activities, stylistic differences in parent-child play across cultures, and the role of parental beliefs and cultural schemas in structuring children's play. This last point touches upon parental ethnotheories – cultural models for how parents should think and act (Harkness et al., 2010; see Fasoli, 2014 for examples of parents' cultural models for play). As we can derive through Harkness and Super (2012)'s theoretical model of parental ethnotheories, cultural models shape parents' specific beliefs about play and development, which eventually influence their practices and strategies. Thus it is important to understand how parents' beliefs about play and the play-related practices they use may differ across cultural contexts. One example is Fasoli (2014), which found that Euro-American parents, as compared to Latino parents, more highly endorsed that children learned through playing and children's independent engagement in play, whereas the Latino parents

more highly endorsed parental and peer contributions to learning through play. It is no surprise

then that they also found that the Euro-American parents spent more time in child directed

pretend play than the Latino parents, and their children spent more time with an adult during play

and less time with other children. On the other hand, McFarland and Laird (2018) did not find

any differences in attitudes towards children's outdoor risky play between U.S. and Australian

parents. These contrasting results in differences in play across cultural groups illustrate the

importance of identifying both similarities and differences in play across cultural contexts.

Child Characteristics, Temperament, and Shyness

Thus far I have detailed how the subsystems of the niche and the wider cultural context

are related to play, and I now turn towards the role of the child in shaping their own

development. One notable way that children can influence their play outcomes is through their

temperament- the biologically based differences in children's behavioral styles (Carey, 1997)

and reactivity to the environment and self-regulation (Rothbart, 2011). Thomas and Chess and

colleagues conceptualized temperament as consisting of nine dimensions of activity, adaptability,

distractibility, intensity, mood, persistence, regularity, sensitivity, and withdrawal (Chess &

Thomas, 1996). Dissonance between a child's temperament and the opportunities and demands

of the environment leads to negative and maladaptive development, whereas consonance among

temperament and environment leads to positive and healthy development, referred to as

"goodness of fit" (Chess & Thomas, 1996).

In the present study I focused on the temperament dimension of withdrawal which is

linked to behavioral inhibition and shyness. Goodness of fit, as described above, has immediate

connection to the relation among the child and niche subsystem of physical and social settings.

We may expect, for example, that higher levels of shyness may lead to children withdrawing

from peers and adults, leading to children spending more time playing alone. This has

implications for development, as children's preference for solitary play has been found to be

associated with peer exclusion, mediated through asocial behaviors (Ooi et al., 2018). Coplan et

al. (2010) evaluated in the impact of an intervention on inhibited children, with the intervention

consisting of unstructured and structured play sessions, peer interactions, and activities for

children. They found that inhibited children in the intervention group exhibited less reticent-

wariness behaviors (e.g., playing alone, onlooking, crying) and higher social-competence (e.g.,

social initiations, social play, peer conversation) during indoor free play than children in the

control group. The point of these examples being, that without intervention, highly shy children

in a school or peer setting are likely to exhibit asocial behaviors during play which can lead to

poor development.

Returning to Harkness and Super (2012)'s theoretical model, parental beliefs influence

practices and strategies after adjusting for intervening factors- which we can extend to children's

temperament and shyness. An interaction among shyness and the niche subsystem of caretaker

psychology, following with parenting practices, can be seen in Gagnon et al. (2014) which found

that for children with high levels of reactivity (composite of the Behavioral Style Questionnaire

intensity & withdrawal subscales), higher levels of authoritarian parenting were associated with

higher levels of play disruption and lower levels of play interaction, whereas higher levels of

authoritarian parenting were associated with higher levels of play interaction for children low in

reactivity. To make matters more complicated, the relation between child and caretaker

psychology can vary across cultural contexts as well. Indeed, Super et al. (2008) showed that the

correlation among withdrawal and mother-rated child difficulty varied across seven countries.

While higher levels of withdrawal were statistically significantly correlated with higher levels of

difficulty in Italy, smaller and non-statistically significant correlations were found in the Australian, Dutch, Polish, Spanish, Swedish, and U.S. samples.

Current Study

As suggested by the above review, the quality of children's play is influenced by relations among the physical and social settings of play, customs of care, caretaker psychology, child shyness, and the wider cultural context. However, the quality of children's play and opportunities for children to play are different matters. As Roopnarine and Davidson (2015) touch upon, children's time spent in play competes with time spent in other activities like watching television and schoolwork. A variety of environmental factors provide an additional limit on parent-child play. Daily play time was only one of nine activity categories that were assessed by Harkness et al. (2011), and it is evident that an increase in play would have to mean a decrease in one or more of the other eight activities or sleep, each having important implications for development. Although some attention has been directed to how the subsystems of the niche may regulate children's opportunities for play, the same cannot be said for the child's role in this matter. In the Developmental Niche framework, the child is viewed as an active participant in their niche. Thus, the aim of the current mixed-methods exploratory study was to assess the relations among children's shyness (represented by the temperament dimension of Approach/withdrawal), physical and social settings, customs of care, parental ethnotheories, and time spent playing in average day, in five countries: Italy, Spain, Sweden, the Netherlands, and the United States. Based on daily diary data, I assessed the association between children's shyness and daily play time and the probability of playing in four settings (outside, at home, with family, & with peers), and whether these associations varied by country. Through semi-

structured interviews with U.S. parents I investigated the association between children's shyness and settings of play, types of play, and parental ethnotheories of play and development.

Methods

Sample

The data for this study came from a larger cross-cultural project known as the International Study of Parents, Children, and Schools. The ISPCS recruited 60 children and their families within Australia, Italy, Poland, the Netherlands, Spain, Sweden, and the United States. Within each country, male and female children were equally sampled within each of the following age-cohorts: 6 months, 18 months, 3 years, 4.5 years, and 7 to 8 years-old. These native-born and native language speaking families were recruited from sites broadly representative of a local middle-class population in a city or region within each country. The Spanish and Italian samples were recruited from urban sites, and the Dutch sample from a peri-urban site. On the other hand, the Swedish sample was recruited from a suburban site, and the U.S. from two sites: one rural and the other suburban. Within the sites, the families were recruited through local school, community, and organizational networks. Data collection included a temperament questionnaire, diary reports of children's daily activities, and parent interviews. Samples available for the present study consisted of 117 three to eight-year-old children and their families from five of the seven original countries: Italy, the Netherlands, Spain, Sweden, and the United States. Table 1 provides sample sizes segmented by country, child age, and child gender. A smaller subset of the U.S. sample (n = 18) completed both temperament questionnaires and semi-structured interviews.

Procedure and Measures

Daily Play Activities

Information on children's play was collected through parent reported diaries on their children's daily activities over a seven-day period. At an initial visit between a research team member and each family, the parents were asked, for each day, to closely specify the activity their child engaged in on a single line in free text, with columns denoting time, location, and others present. When the current activity ended and new activity started, the parents described that activity on the next line. The time spent in an activity was calculated as the difference between the time listed for the initial activity and the time listed on the subsequent activity. At a follow-up visit, a researcher reviewed the diaries with the parents to clarify and add additional information as needed. Only play activities were used for this study, which included play sessions outside, at home, with family, and with peers. This data format, with activities nested within days nested with children, was used to model the association between shyness and play activities in the four physical and social settings of interest. Time spent in play activities were summed within each day to derive total time spent playing for each day. This daily version of the data, with days nested within individuals, was used to examine the association between shyness and time spent playing in an average day.

Harkness et al. (2011), a previous study using the ISPCS data, revealed how parents viewed children's play and other activities within each of the five countries through parent interviews. Italian parents had discussed children's play in the context of their children forming social relationships and emotionally close relationships within the family. Similarly, Spanish parents also described play as being important to the development of their children's sibling and peer relationships. The Swedish parents on the other hand discussed play in the context of their

children's independence and individual choice. The interviews in the Dutch sample focused

more on family relations and children's individual choice, and the U.S. sample focused more on

developmental and school activities, rather than on the salience of play.

Child Shyness

The Behavioral Style Questionnaire (BSQ: McDevitt & Carey, 1978) was used to

measure children's shyness. Parents completed the BSQ which included 100 questions that

assessed parents' perceived frequency (1 = almost never, 6 = almost always) of a wide variety of

specific behaviors related to the nine Thomas and Chess dimensions of temperament: activity,

adaptability, distractibility, intensity, mood, persistence, regularity, sensitivity, and

Approach/withdrawal. These items were then summed to derive scores for each of these

temperament dimensions, which were then standardized across the seven countries in Super et al.

(2008). The standardized withdrawal score was used as the measure of shyness in this study,

which had a median Cronbach's Alpha of 0.77. Higher scores indicated higher levels of

withdrawal. Since the data for the current study was a subset of the data used in Super et al.

(2008), the temperament scores represent children's temperament in relation to the larger ISPCS

sample standardized across the seven countries.

Caretaker Psychology

Semi-structured interviews were carried out with 18 U.S. parents at their home.

Discussions included information on parents' descriptions of their child, their children's daily

routines and activities, their own experience growing up, their child's education, and their role as

a parent. A special emphasis was placed on the meaning and importance of children's activities

to the parents. The interviews were then transcribed verbatim, and then coded by the first author

in Dedoose- an online platform for analyzing qualitative data (Dedoose Version 8.0.35, 2018).

Plan of Analysis

The present study analyzed parent ratings of temperamental withdrawal (measure of shyness) and daily diaries of play activities across five countries, and semi-structured interviews with U.S. parents. The daily diaries were analyzed to assess whether children's withdrawal was associated with time spent playing in an average day, and whether this association varied by country. Given that each row in the data corresponded to a separate day and each child had up to seven rows of data, a Bayesian random-intercepts multilevel model was carried out with hours spent playing in a day as the outcome variable and structured so that days were nested within children. The variation in the outcome was partitioned by variance explained between days, variance explained between children, & unexplained variance). Covariates included in the model were Weekend (0 = weekday, 1 = weekend), Male (0 = female, 1 = male), Age (referent group = 3 years; comparison groups = 4.5 years, 7 to 8 years), Country (referent group = United States; comparison groups = Italy, Netherlands, Spain, Sweden), Withdrawal, and a Country x Withdrawal interaction. Next, this study aimed to assess whether withdrawal was associated with the probability of children playing in four overlapping physical and social settings: 1) outside, 2) at home, 3) with family, and 4) with peers. This study also aimed to assess whether these associations varied by country. Since the data for these analyses were structured so that each row in the data was a play observation with n number of rows for each of up to seven days for each child, four Bayesian random-intercepts logistic multilevel models were carried out with the same covariates as the daily play model described above. The models were structured so that observations were nested within day, and day nested within child (variation in the outcome partitioned by variance explained between play observations, variance explained between days, variance explained between children, & unexplained variance). A hierarchical step modeling

process was used to identify the best model for assessing the above outcome variables. Leave-One-Out Cross-Validation (LOO), an estimate of a model's predictive accuracy, was used to identify the best step per model.

Next, I indexed and thematically coded 18 U.S. parent interviews to provide context to the daily diary analysis and the sample. These analyses and inferences were not made to make generalizable out-of-sample claims, but for understanding within-sample variability in parents' ideas about their children's shyness and play activities. The coding process was guided by the Developmental Niche framework (Super & Harkness, 1986). As described in the literature review, this framework views children's development through the interactions among the child and the niche's three subsystems of everyday settings, customary practices of childrearing, and the caretaker psychology, which are all influenced by the overarching cultural context. Therefore, codes were developed based on the elements of the developmental niche described above, which revealed three broad categories of codes. The first category, *Child Shyness*, was used to index instances in which parents described their child as being shy and as sociable, which applied the Caretaker Psychology subsystem of the developmental niche. The next set of codes, *Caretaker Psychology Themes*, were derived via thematic analysis of parents' comments about specific goals they had for their child's development, their parenting practices, and generally what they believed as important for parenting and children's development. Thus this set of codes was used to apply the developmental niche subsystems of Caretaker Psychology and Customs and Practices of Childcare, and how they may be related as might be explained by the theoretical framework. The codes in the *Physical and Social Settings* category were used to index instances in which parents explicitly described their child having played outside, at home, with family members, and with other children, as well as instances of the child playing alone. This set of

codes was related to the Physical and Social settings subsystem of the Developmental Niche. Lastly, descriptions of the style of the child's play were indexed by codes in the *Types of Play* category.

Frequencies were calculated for the codes (0 = code absent, 1 = code present). Given the small sample size and that this study aimed to assess whether parents of shy and non-shy children differed in mention rate of the above codes, we used a two-step process. First, a Bayesian multilevel logistic regression model was carried out to assess the association between withdrawal and the probability of each of code being applied to an interview. Since there were 18 codes in total, a multilevel logistic model with a multivariate outcomes approach was used instead of a typical logistic regression model, so that we could estimate more conservative effect sizes in comparison to carrying out a separate logistic regression for each code. The multilevel model was structured so that observations were nested both within person and within code, with a random slope of withdrawal across code. Therefore, the data were structured so that each row in the data referred to a specific code, with 18 rows of data for each of the 18 parents. This approach estimated a mean association between withdrawal and the codes in general (grand mean effect) and variation around the grand mean effect for each code (random effect or slope). The estimates of the association between withdrawal and each code were pulled toward the grand mean effect of withdrawal across all codes. Then, model estimates were used to predict the probability of each code being applied to an interview for parents of children 1.5 standard deviations below the mean (non-shy) and 1.5 standard deviations above the mean withdrawal score (shy). It is important to recognize that due to the small sample size for the parent interviews, the associations with shyness were high in error or uncertainty and it is likely that the effect sizes were estimated to be larger than would be estimated in a larger sample. As a result,

interpretations of these effects sizes were limited to the direction of the effect, the size of the

effect in relation to the other codes, and the content of parents' comments within each of the

codes.

All models described above were carried out using R (R Core Team, 2020), the brms

package for R (Bürkner, 2017), and the STAN platform for Bayesian modeling (Stan

Development Team, 2018). All visualization was done using the ggplot2 package for R

(Wickham, 2016). Of note, inference for Bayesian models may differ compared to regression

models typically presented in most studies. Although a single effect size is estimated in a typical

regression model, Bayesian regression models instead estimate a posterior distribution. This

posterior distribution represents the range of plausible effect sizes, with some effect sizes being

more or less likely than others. The posterior distribution can be difficult to interpret directly,

and for this reason, we described the posterior with the mean and standard deviation. The mean

represents the average effect size, and the standard deviation represents error in the effect size.

Larger standard deviations indicate more error and less precision. 95% credibility intervals are

also given for the effects of withdrawal, which represent 95% of the effect sizes given in the

posterior, centered at the mean. In instances in which the posterior distribution spans both

negative and positive effect sizes, we calculated the probability of the effect sizes being in either

direction. Another important feature of Bayesian modeling is the use of prior information or

"priors" on the research topic of interest, which is integrated with information from the data to

estimate the posterior distribution. Given the lack of previous research on this study's topic of

interest, the R brms package's default priors were used which were weakly informative

(Buerkner, 2020). These priors do not strongly influence the estimation of the posterior

distribution but are useful for limiting extreme values estimated from the data (Betancourt, 2017).

Results

Table 2 provides means and standard deviations of children's withdrawal scores and daily time spent playing for the whole sample, and by country, gender, age, and type of day. Child withdrawal scores were mean centered so that a score of zero reflected a child of average withdrawal across the whole sample. These scores ranged from -0.68 to 0.95. Given these estimates, a -0.48 withdrawal score would reflect a child 1.5 standard deviations below the mean (non-shy) and a 0.48 score would reflect a child 1.5 standard deviations above the mean (shy). Additionally, Table 2 also provides 1) the average amount of hours played in a day and 2) the proportion of reported play sessions in the four physical and social settings, for the whole sample, and by country, gender, age, and type of day. Children, across the whole sample, spent the least time playing with peers, then outside, with family, and at home, on average. Lastly, since the daily diaries revealed that none of the Dutch play sessions included peers, the Dutch sample was excluded from the model assessing the probability of children playing with peers.

Daily Diaries

We carried out five Bayesian multilevel models to analyze the diary data. The results of these analyses can be found in Table 3 for the daily play time model and Appendices A through D for the four play setting models. It is important to note that the estimates for the daily play outcome are on the hour scale. For example, a mean 0.50 would indicate half an hour and an estimate of 1.00 would indicate one hour. The four play setting models, Outside, Home, Family, and Peer, have parameter means and standard deviations on the logit scale. Parameters on the logit scale can be transformed to the probability scale.

We present the Leave-One-Out Cross-Validation (LOO) estimates for each step for each

model (see Table 1 & Appendices A - D), which is an estimate of a model's predictive accuracy.

It is generally advised that when comparing model steps, the step with the lower LOO estimate is

preferred for predicting out-of-sample scores on an outcome. This is especially the case when the

step with fewer parameters has the lower LOO estimate, with the notion that one can have just as

accurate or even more accurate predictions with a more parsimonious model. As can be seen in

Table 3, the first step of the model included only random intercepts for day and child. The

second step included the adjustment variables of country, gender, age, and weekend. The third

step included the main effect of withdrawal, and the fourth step included a country x withdrawal

interaction.

Model 1: Daily Play Time Across Five Countries

As can be seen from the LOO estimates in Table 3, the fourth model step with a country

x withdrawal interaction was preferred- indicating that the association between withdrawal and

play time was not the same across all the cultural sites. Therefore, we next describe the

parameter estimates for the fourth step (see Table 4). When it came to country differences in play

time, Dutch children spent the most time playing at 3.87 hours, followed by Swedish children at

3.46 hours, Spanish children at 2.98 hours, U.S. Children at 2.96 hours, and Italian children at

2.91 hours. These estimates are based on 3-year-old female children on weekdays, but one can

add the parameter estimates for gender, age, and type of day to calculate the time spent playing

for male and older children in the sample and on weekends. The following covariates indicate

how gender, age, and day of the week are associated with daily play time. Male children played

for 0.06 hours more than female children. 4.5-year-old children spent 0.58 hours less and 7 to 8-

year-old children spent 0.29 hours less than 3-year-old children in an average day. Children spent

1.04 more hours playing on the weekend compared to weekdays.

Figure 1a shows the effect of withdrawal on daily play time across the whole sample.

After adjusting for all other covariates in the model, a one unit increase in withdrawal scores was

associated with a 0.32 hour decrease in time spent playing [-1.02, 0.35: 82.53% negative]. This

effect would indicate that a non-shy child is predicted to spend 0.96 more hours playing per day

than a shy child. A country x withdrawal interaction was added in the fourth step of the model

which revealed that the direction of the withdrawal effect varied by country (see Figure 1b).

To explore this country x withdrawal interaction, the posterior samples for the U.S.

withdrawal effect size and posterior samples for the difference in the effect size between the U.S.

and other countries were summed to create posterior distributions of the withdrawal effect size

within each country. On one hand, higher withdrawal scores were associated with a 1.24 hour

decrease for Swedish children [-2.56, 0.13: 96.98% negative], a 0.96 hour decrease for Spanish

children [-2.21, 0.31: 93.33% negative], and a 0.26 hour decrease for U.S. children [-1.73, 1.20:

64.03% negative]. On the other hand, higher withdrawal scores were instead associated with a

very small 0.07 hour increase for Dutch children [-2.03, 2.11: 52.50% positive], and a larger

1.69 hour increase for Italian children [0.02, 3.32: 98.60% positive].

Models 2 - 5: Physical and Social Settings of Play

The LOO estimates in Appendices A through D indicate that model steps three and four,

which included the pooled effect of withdrawal and the country x withdrawal interaction, were

not preferred for any of the play setting outcomes. As such, there is a lack of evidence of

withdrawal being strongly related to the probability of playing in these four settings, across the

whole sample and within each of the countries specifically. Nonetheless, we go through the preferred steps for each of these four outcomes next.

Predicting the probability of playing outside was best explained by the first model step (see Appendix A). On the other hand, the outcome of playing at home was best explained by the second step estimating differences between countries, gender, age, and type of day (see Appendix B). Generally, from highest to lowest, Dutch children had the highest probability of playing at home, followed by U.S. children, Spanish children, Swedish children, and then Italian children. Male children had a higher probability of playing at home than female children. Additionally, 3-year-old children had a higher probability of playing at home than their older counterparts. Playing at home also had a higher probability of occurring on weekdays compared to weekends. Next, the outcome of playing with family was best explained by the first step (see Appendix C). Lastly, the second step estimating differences in the peer outcome between countries, gender, age, and type of day, was the preferred model step (see Appendix D). The parameters of the model indicate that Swedish children had the highest probability of playing with peers, Italian children the second highest, U.S. children the third highest, and Spanish children with the lowest probability. Male children had a higher probability of playing with peers compared to females. 3-year-old children had a lower probability of playing with peers compared to the older cohorts. Children had a higher probability of playing with peers on weekdays compared to weekends.

Thus far the diary analyses have revealed between country variability in the direction of the association between children's withdrawal and time spent in play in an average day. More withdrawn Swedish, Spanish, and U.S. children spent less time in play than less withdrawn children, whereas more withdrawn children spent *more* time in play in the Dutch and especially

the Italian samples. The country specific associations between withdrawal and time spent in play

had the most certainty in the Italian, Swedish, and Spanish samples. There was a lack of

evidence of the association, between withdrawal and probability of playing in each of the four

contexts, averaged across all five countries and within each country. Next we turned to the

analyses of the U.S. parent interviews to provide context to the diary analyses and the U.S.

sample.

U.S. Parent Interviews

The coding of the 18 U.S. parent interviews resulted in four categories of codes: Child

Shyness, Caretaker Psychology Themes, Physical and Social Settings, and Types of Play. Table

4 provides information on each of the codes from each of the four categories. This information

includes the proportion of the 18 participant interviews that each code was applied to, multilevel

logistic model parameters describing the association between child withdrawal and probability of

each code being applied to an interview, and predicted probabilities for an interview having a

code applied for generally non-shy, average, and shy children. As a reminder, a zero on the

withdrawal scale represents a child average on withdrawal according to the sample of 299 three

to eight-year-old children from Australia, Italy, the Netherlands, Poland, Spain, Sweden, and the

United States. A child with a -0.48 or larger withdrawal score would be considered a non-shy

child and a 0.48 or larger withdrawal score as shy. Throughout this section I provide the

withdrawal score for children of the parents whose comments were quoted and use these labels

to describe the children. Children with withdrawal scores ranging between zero and -0.48 were

described as slightly non-shy and scores ranging between zero and 0.48 as slightly shy. A

histogram of child withdrawal scores for the 18 U.S. parents can be seen in Appendix E.

Child Shyness

Two codes were used to index instances in which parents described their children as shy or social. As shown in Table 5, higher levels of withdrawal were associated with an increased probability of a parent describing their child as both shy and as sociable. Predicted probabilities indicated that parents of non-shy children had a 26% probability of describing their child as shy and 26% as social. Whereas parents of shy children had a 50% probability of describing their child as shy and 44% as social. Descriptions of child shyness typically consisted of parents describing the child as typically spending time alone, not interacting with other children and adults, being quiet, not being friendly, and being apprehensive or anxious. The father in the following Excerpt 1 perceived his slightly shy 4.5-year old daughter's play behaviors as illustrations of shyness. For example, she preferred to play by herself and would not be as likely to join groups of children for playing.

> … she tends to be over perspective, a little more on the loner side, she likes playing with herself a lot and she plays with other kids, it might be her age, quiet… introspective but she's a fun kid, she's really bright but she's not one to go join groups… she's kind of quiet and reserved (Excerpt 1: 0.16 withdrawal score).

In contrast, descriptions of child sociability included being active, friendly, having a lot of friends, socially savvy, easy to be with, and spending a lot of time with other children. Excerpt 2 illustrates this as a mother described her slightly shy 7 to 8-year old daughter as always wanting to spend her free time with other children during the weekend.

> She's really, really social. If she could she'd spend a lot of her time with her friends, like her sleep over party tomorrow night, she would sleep over on Friday night, spend Saturday morning at her [friend]'s and then call Saturday at noon and say can she spend the rest of the day at [friend]'s. I mean she would just go from one friend to another all weekend and I put limits on that... (Excerpt 2: 0.21 withdrawal score).

It is important to note that parents did not necessarily describe their child as only being shy or only being social. For example, Excerpt 3 shows how at first the father described his slightly non-shy 7 to 8-year-old daughter as being energetic and rambunctious but also as being shy. Following that exchange, the same father made the distinction that his daughter was shy mostly around strangers. The mother then further described this shyness as the daughter being shy around people at first, but then becoming more sociable as time went on. Such a description is indicative of Thomas and Chess (1977)'s concept of the slow-to-warm-up child, which is used to describe a child that is high in both withdrawal and adaptability. This may provide understanding to why higher withdrawal scores were associated with higher probabilities of parents describing children as being both shy and sociable.

> Interviewer: How would you describe [child] to us?
>
> Father: She can be very rambunctious, energetic, but yet on the other side she can be very shy."
>
> …..
>
> Interviewer: Can you give some instances or situations when she has been shy?
>
> Father: Mostly around strangers.
>
> Mother: She will take a while to get to know someone but then once she does, she can't keep quiet. Like at the beginning she kind of assesses the situation and watches what's going on, she's real curious, but she's usually pretty quiet during that time and then all of a sudden she just like comes out of her shell... (Excerpt 3: -0.20 withdrawal score)

Caretaker Psychology Themes

Twenty-two percent of the parents expressed that it is important for children to spend time playing. Excerpt 4, for example, shows a mother expressing that she believed that as a parent she could help her shy 3-year-old daughter by letting her play at home and outside. With an effect size of 0.61 log-odds, it was predicted that parents of non-shy children had a 22%

probability of believing that children's play is important, compared to 34% for parents of shy

children.

> … but just giving her the opportunity to be with other kids, and giving her opportunities
> to play, which is, I mean, I think, the best thing in the world, for a kid who is 3, to just be
> able to play. Giving her the things here to play with, the things outside of the house to
> play with, places to go (Excerpt 4: 0.90 withdrawal score).

Next, the family time code was used for when parents expressed that children should spend time

with family or that they made explicit time for the family to spend time together. Fifty percent of

the interviews had this code applied, with an effect size of -0.68. Predicted probabilities for

parents of non-shy and shy children were predicted to have a 55% and 39% probability of

expressing that family time is important. In some instances, parents described having to carve

family time out of an already busy schedule (see Excerpt 5 for example).

> … she likes to go over next door and I'm like, "no this is family", I don't want to bother
> their family time and I think that it's important that we are together, we don't have that
> many family dinner times during the week so the weekends family dinner times we're all
> together (Excerpt 5: Mother of slightly shy 4.5-year-old daughter with a 0.16 withdrawal
> score).

When it came to the code of time outside, only 17% of the parents described the importance of

children spending time outside. Higher withdrawal was associated with a higher probability of

interviews having this code applied. Predicted probabilities suggest that parents of non-shy

children had a 17% probability of having time outside as a parental goal, whereas parents of shy

children had a 33% probability. The few parents that mentioned this code had expressed that they

thought it was important for children to spend time outside (see Excerpts 4, 6, & 7).

> I had a lot of parents ask me what can I do over the school, what can I do over the
> summer, let your children play, let them go outside, go to the beach, you know take them
> places (Excerpt 6: Mother of slightly shy 4.5-year-old daughter with a 0.16 withdrawal
> score).

Relatedly, two of the parents described the importance of time outside as also involving play

(Excerpts 4 & 7).

> Interviewer: What do you think is most important for [child]'s development right now?
>
> Father: I think just exposing her to everything that we can expose her to in terms of letting her do more things. A lot of its physical too. We do a lot of books and a lot of reading, a lot of activities, math, she does a lot of imaginative play and also physical so she can develop... like swimming and things that are easy to learn when you're young. Swimming and riding her bike and playing outside and so exposing everything including languages (Excerpt 7: Father of slightly non-shy 4.5-year-old daughter with a -0.03 withdrawal score).

The peer interactions code had a rate of 50% and was used when parents expressed the

importance of their child interacting with other children. Higher withdrawal was associated with

a higher probability of this code being applied. Parents of non-shy children were predicted to

have a 34% probability of expressing these ideas, whereas parents of shy children were predicted

to have a 56% probability instead. Generally, parents expressed that peer interactions help

children develop social skills (e.g. Excerpt 8). Typically, these comments about spending time

with other children centered on the activity of play. Furthermore, the mother in Excerpt 8

described how they want to slowly get their slightly shy 7 to 8-year-old daughter to become more

acclimated to other children so that she can have a fulfilling social life.

> … probably try to introduce her to more children, put her in situations where she's around more children although we have, she's in sports and that sort of thing, but maybe one on one I think my next plan is to start inviting one person over rather than in a big group because I think also she's a little shy, so, and I think that, I think that that's really important for kids to have friends in terms of all their entire self, … and I think that if she had a little bit more busy social life, you know she'd do well in both areas (Excerpt 8: 0.12 withdrawal score).

Excerpt 9 illustrates the connection that parents made with the parental goals of peer interactions

and social skills. Thirty-three percent of the 18 parent interviews had the social skills code

applied to them.

> I want him to play with other children several times a week because I want him to, he's only three years old but just beginning the rudiments of socializing with other children, some of the basics like you have to share... (Excerpt 9: Mother of slightly non-shy 3-year-old son with a -0.30 withdrawal score).

Higher withdrawal scores were also associated with a higher probability of parents expressing the importance of children developing social skills. Predicted probabilities showed that parents of non-shy were predicted to have a 30% probability of expressing that children developing social skills is important. Parents of shy children, however, were predicted to have a 40% probability. This code indexed instances in which parents described having their children participate in activities to develop social skills or that they thought social skills were important for children's development (e.g., Excerpt 9).

> Interviewer: What would you consider ideal qualities in a boy of [child]'s age? …
>
> Mother: To be well mannered and respectful by that age.
>
> Father: An awareness of the social world around him. That there is order to our relationship and to relationships with other adults and other kids and acting appropriately. When you are a guest behave like a guest and when you are a host behave like a host. When you are in the presence of adults, behave one way. In presence of your peers, behave another way. Understand pecking order within your peer set. Those kind of things I think will really relate to a lot of success for him because you can easily grease your path to whatever if you understand the relationships that can get you there or stop you from getting there. That's a very big personal value judgement but I think relationships drive everything. But yes, in awareness of social structure and just being happy (Excerpt 10: Mother & Father of slightly non-shy 4.5-year-old son with a -0.13 withdrawal score).

Lastly, the daily routines code was used in instances in which parents mentioned that they set a daily routine for their child or that routines are important for children's development (e.g., Excerpt 11). Only 39% of the 18 parent interviews had this code applied. Higher withdrawal scores were associated with a lower probability of a parent finding daily routines to be important. Predicted probabilities for parents describing daily routines as important showed that there was a 50% probability for parents of non-shy children and 30% for parents of shy children.

> Interviewer: Do you believe it's important to have a regular schedule or is it better to let the days' routines take care of themselves?
>
> Mother: A regular schedule is good and she has a regular schedule. She goes to gymnastics, swimming and preschool. Those are set times and she likes that. Other than that we just do what needs to be done in between.
>
> Father: I believe that its real important. She needs to have that structure. At least she knows when everything is going to happen (Excerpt 11: Mother & Father of slightly non-shy 3.5-year-old daughter with a -0.03 withdrawal score).

As can be seen from Excerpt 11, these parents emphasized having a routine of activities for their daughter with the assumption that it is beneficial to the child.

Physical and Social Settings

In contrast to the codes for the parenting themes category, the codes in the physical and social settings category reflected instances in which parents explicitly mentioned their children playing in these various settings. Forty-four percent of the 18 U.S. parents described instances of their child playing alone, and higher withdrawal was associated with an increase in the probability of this code. Predicted probabilities indicated that parents of non-shy children were predicted to have a 36% probability of mentioning their child playing alone and a 48% probability for parents of shy children. One mother described how her shy 3-year-old daughter would play alone, imaginatively and with toys.

> … but this day [child] played with dolls by herself and she is also a child who does independent play which was new to us, … but she will play by herself and she loves, loves to play dolls and usually will play by herself but also interact with us she'll come out and ask me to baby-sit like if I'm cleaning up or to do different things, I think I might have told you she also pretends to go to work the other day she said I'm going to work and these meetings are driving me crazy (Excerpt 12: 0.90 withdrawal score).

Next, 72% of parents described instances of the child playing with immediate family members. In contrast to the association between withdrawal and the family time parental goal code, higher withdrawal was associated with a higher probability of a parent describing their child playing

with family. Parents of non-shy and shy children were predicated to have 52% vs 68%

probabilities of mentioning this code. One father described his shy 3-year-old daughter always

trying to engage them in play, often to their detriment (see Excerpt 13).

> [Spouse] goes off to go grocery shopping and comes back and she said did you get
> whatever it was that you were supposed to get done, I said I wanted to get something
> finished, no [child] won't leave me alone I mean I can't get anything done she follows
> me around I incorporate her into chores but I can't sit down and write or talk on the
> phone or read or do anything else cause she just wants to incorporate me into her play
> and… (Excerpt 13: 0.90 withdrawal score).

On the other hand, only a few parents specifically mentioned their child playing at home. Higher

withdrawal was associated with a lower probability of this code. A 23% probability and 21%

probability of mentioning this setting were predicted for parents of non-shy and shy children.

Conversely, most parents had described instances of their child playing outside, and higher

withdrawal was associated with a lower probability of this code. Parents of non-shy children

were predicted to have a 58% probability of mentioning their child playing outside and a 43%

probability was predicted for parents of shy children. As an example, the father in Excerpt 14

described how his more active slightly non-shy 3-year-old son likes to spend much of his time

playing outside.

> [Child] does not like to sit and watch. He likes to be constantly doing something. Well,
> now that summer is here he doesn't want to be inside he always wants to be outside and
> play. It doesn't really matter what it is, as long as it's something that will hold his interest
> and will keep him busy. As I said, he's constantly doing something (Excerpt 14: -0.34
> withdrawal score).

The last setting mentioned, playing with peers, was mentioned by 67% of the 18 parents. Higher

withdrawal was associated with a higher probability of this code with an effect size of 0.18 log-

odds. Based on this estimate, parents of non-shy and shy children were predicted to have 55%

and 59% of mentioning their child playing with peers. Excerpt 15 provides one example.

> In this case [child] actually brought a friend home with her, [friend]. She came home that day and she played outside with her [friend] and three boys who live next door. They played outside for quite a while, like about 45 minutes that day (Excerpt 15: Mother of slightly-shy 7 to 8-year old daughter with a -0.20 withdrawal score).

Types of Play

Thirty-nine percent of the 18 parents had described their child playing by constructing objects and making up games. Higher withdrawal was associated with a lower probability of this code being applied. Parents of non-shy children were predicted to have a 56%% probability of this code being applied. On the other hand, a 34% probability was predicted for parents of shy children. Examples included children making up games or constructing objects with toys like play-doh.

> He does his own thing. He makes a fort in the bay window. Like at night, he's going to bed. He'll say, he's making a nest at the bottom of the bed. He likes to get his own blankets and curl them up at the bottom of the bed. You know, he does his own thing Excerpt 15: Mother of a non-shy 4.5-year-old son with a -0.52 withdrawal score).

Next 44% of parents had mentioned their child playing imaginatively, which was negatively associated with higher withdrawal. As a result, a 44% probability was predicted for parents of non-shy children and a 38% probability was predicted for parents of shy children.

> … it is sort of a mix of all the different family roles and sometimes I'm the big brother and sometimes I'm the daddy and sometimes the mommy, then we play, she comes up with all these different kinds of strange things around Christmas time it was being Santa Claus and it was sort of a horsey back ride on all fours with her on my back and my back became a reindeer instead of horses… (Excerpt 16: Father of a shy 3-year-old daughter with a 0.90 withdrawal score).

Similar to the peer setting code, most of the 18 parents had mentioned their child engaging in physical play. Higher withdrawal was associated with a higher probability of this code, with 48% and 51% probabilities predicted for parents of non-shy and shy children. Lastly, 50% of parents had mentioned their child playing with toys. Higher child approach scores were associated with a

higher probability of a parent mentioning this code. Parents of non-shy and shy children were predicted to have 39% and 52% probabilities of mentioning this code.

Discussion

This study assessed 1) the associations between shyness and daily play time and the 2) the association between shyness and probability of playing in four physical and social settings, and 3) whether these associations varied by country. Additionally, parent interviews were analyzed to provide context to the above associations. To better understand the implications of the findings in this study, information on children's daily activities were drawn from Harkness et al. (2011)- another study that used ISPCS data. As can be seen on page 84 in Harkness et al. (2011), Table 2 includes hourly time spent in the activities of meals, family, play, school-related and developmental, watching TV, grooming, travel, at preschool and school, and other, in the five countries from this study. It is expected that some of these activities would be mandatory or directed by parents (e.g., school, meals, family, etc.), and others the child initiated themselves. In Table 5 we included hourly time spent in the play, watch TV, and other categories, which were then summed to calculate the child's discretionary time. Parent directed time was calculated as the difference between child discretionary time and total daily time.

In regard to the first aim of this study, we found that a one unit increase in shyness was associated with a 0.26 hour decrease or 15.60 minute decrease in play time in an average day, or a 0.96 hour difference in play time between a shy (1.5 standard deviations above the mean withdrawal score) and non-shy child (1.5 standard deviations below the mean). In the context of child discretionary time averaged across all five countries (see Table 5), this would mean that shyness was associated with a 6% change in time spent in these activities – a very small effect. More importantly, the direction and magnitude of the association between shyness and daily play

time varied by country. One reason for why the association between play and shyness was larger in magnitude in the Italian, Spanish, and Swedish samples could be the salience of children's play for parents within those contexts as compared to the other contexts. For example, Harkness et al. (2011) showed how play was a salient topic in interviews with Italian, Swedish, and Spanish parents, but was not as salient in the U.S. and Dutch samples which focused more on other daily activities.

We use the effect size of shyness in Sweden and Italy as examples for exploring the cross-cultural variation in the direction of the association between shyness and play. A one unit increase in shyness in Sweden was associated with a 1.24 hour decrease in play time or 25% change in child discretionary time. Whereas shyness was associated with a 1.69 hour increase in play time or 42% change in child discretionary time in Italy. These findings highlight an important consideration that if we had simply stopped at modeling the association between shyness and play time across all five countries, we would have inferred that shyness had a very small negative association with play time. However, examining the association between shyness within each country revealed a negative direction in some countries, and a positive direction in others. In particular, the association between shyness and daily play time in the Italian context was strikingly different in comparison to the other countries warranting further investigation. It may be possible that the association between withdrawal in play time in the Italian context may be mediated by parents ratings of their child's difficulty, given that Super et al. (2008)'s study on the larger ISPCS sample with seven countries revealed withdrawal to be correlated with parent-ratings of their child's difficulty only in the Italian sample. Given the exploratory nature and smaller sample size of this study, we recommend that future research should replicate this finding of cultural variation in the direction of the association between shyness and play, with

larger samples. Additionally, this study only included western countries. Future studies should also sample countries from other areas to further explore variability in the associations of shyness across culture. Sampling Chinese families would be particularly interesting given the salience of shyness in the Chinese context.

Shyness, Settings of Play, and Caretaker Psychology

We assessed the association between children's shyness and the probability of playing in various physical and social settings, as well as caretaker psychology, with the aim of understanding potential differences in daily play time. Our analyses provided no support that shyness was strongly associated with the probability of playing outside, at home, with family, and with peers. As for the U.S. parent interview analysis, several interesting findings emerged. Shyness was associated with an increased probability of U.S. parents describing their child as both shy and sociable- indicating that parents may not perceive their children exclusively as either shy or sociable, which may have implications for parental ethnotheories and parenting practices in relation to play. It is also possible that our measure of shyness, temperamental withdrawal, was not an accurate measure of parents' perceptions of their children's shyness which may include more aspects than only withdrawal. Another interesting finding was that higher levels of shyness were associated with the probability of parents expressing that children's play is important. It is possible that U.S. parents may have expressed the importance of play if they were concerned that their shy child is not spending enough time playing- a hypothesis that cannot be tested with the current data. Furthermore, higher levels of shyness were associated with a higher probability of U.S. parents expressing the importance of social skills, peer interactions, and time outside, and a lower probability of expressing that family time is important. Similarly, higher levels of shyness were associated with a higher probability of U.S.

parents reporting their child playing with family and lower probability of playing outside. Again, we may expect that these findings would provide evidence for associations between shyness and the probability of playing in the four physical and social settings. However, the diary analyses did not support these expectations.

Exploratory and Mixed-Methods Research

This study showed the complementary nature of mixed-methods and exploratory studies for child development research, especially in studies with smaller samples. The benefit of utilizing mixed-methods in this study was that, guided by the theoretical framework, the diaries and parent interviews served as context and agreement/disagreement for each other. As mentioned in the previous section, the diary analyses of the physical and social settings of play did not provide evidence for the direction of effects indicated by the parent interview analysis- that child shyness was associated with a higher probability of parents mentioning their child having played with family and a lower probability of parents mentioning their child having played outside. Without the diary analysis, we may have made stronger interferences from the findings of the parent interviews that were not supported. Another benefit is that the parent interviews provided further context for the diary analyses, and considerations to be made for future research. Since shyness was found to have a positive association with parents describing their child as both shy and as social, future studies may benefit from using a more nuanced measure of shyness. The Thomas and Chess model conceptualizes withdrawal on a scale- withdrawal on one end and approach on the other. Other studies may benefit from using a temperament model and measure that conceptualize shyness and sociability as two separate dimensions, such as the Rothbart temperament model. Including sociability and a sociability x country interaction, with withdrawal in our diary analysis, may provide further understanding to

how children impact the niche across cultures in terms of play. It is important to note though that with mixed-methods a researcher has to balance sample size and the multiple sources of data.

One last important point is that due to the exploratory nature of this study and the smaller sample size, these findings should be taken as suggestive instead of conclusive. With the analysis of daily play time, we can give more confidence to the association between shyness and play in some countries more than others. Based on the probability of the associations being negative or positive- we have more confidence or less uncertainty in the associations with larger probabilities.

Methodological Considerations for Future Studies

Although we did find that parents' perceptions of their children's shyness were differently associated within each of the countries, we did not find any evidence to suggest that this cross-cultural variation could be attributed to playing outside, at home, with family, and with peers. Therefore, future studies should assess other contexts as potentially mediating the relation between shyness and play across cultures. This can be done most effectively through a mediation model in multi-group structural equation modeling, with settings of play and caretaker psychology on play mediating the relation between shyness and time spent in play- across multiple countries. This approach requires a much larger sample size than we had in the current study, so future studies would require larger samples across and within countries. Another methodological and theoretical consideration is that children's shyness does not necessarily act independently of other temperament dimensions. For example, how would the association of shyness with play time differ for children high in adaptability and those low in adaptability? So future studies would benefit by adding other temperament dimensions to the daily play time model we carried out, with interaction terms with shyness. An alternative approach would be to

carry out a mixture model with temperament dimensions as indicators which would identify

latent subgroups of temperament profiles. Such an approach would assess whether these

temperament profiles differed in time spent in play, and whether these differences also differed

by country.

In summary, this study shed light on how children's shyness can impact their niche in

producing variation in play time- validating the child's role in contributing towards their own

development. At the same time it showed that the cultural context is an important factor to

consider when thinking about the unique aspects of children and their impact on the

environment. While there is a general push for children to spend more time in play in the U.S.,

this may not be the case in other countries - especially regarding shy children. With this in mind,

we can aim to draw more inclusive conclusions about children's development that integrate

understanding of both the child and the cultural context.

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Table 1

Sample Size by Country, Child Age, and Child Gender

Country	Child Age			Child Gender		
	3 years	4.5 years	7 to 8 years	Female	Male	Total
Italy (IT)	10	8	8	13	13	26
Netherlands (NL)	3	6	7	6	10	16
Spain (ES)	6	11	7	14	10	24
Sweden (SW)	8	9	8	15	10	25
United States (US)	5	10	11	11	15	26
Total	32	44	41	59	58	117

Note.

Table 2

Descriptive Statistics of Withdrawal and Daily Diary Outcomes of Interest for the Whole Sample, and by Country, Gender, Age, and Days

			Daily Diary Outcomes of Interest			
			Proportion of Play Sessions in Physical and Social Settings			
	Withdrawal	Hours in Daily Play	Outside	Home	Family	Peer
Whole Sample	0.00 (0.32)	3.30 (2.04)	20.72%	77.20%	72.38%	8.50%
Country						
Italy	0.05 (0.28)	3.13 (2.04)	12.60%	72.10%	85.20%	12.30%
Netherlands	-0.02 (0.28)	3.87 (2.07)	28.60%	86.10%	27.80%	0.00%
Spain	0.01 (0.38)	3.05 (1.98)	19.80%	69.80%	88.50%	4.20%
Sweden	-0.04 (0.33)	3.49 (2.12)	20.40%	72.40%	87.50%	15.30%
United States	-0.02 (0.32)	3.08 (1.93)	20.10%	82.00%	83.40%	9.01%
Gender						
Female	0.03 (0.36)	3.24 (2.12)	19.40%	74.50%	73.50%	8.43%
Male	-0.03 (0.27)	3.35 (1.97)	21.90%	79.60%	71.40%	8.56%
Age						
3-years old	0.04 (0.34)	3.57 (2.11)	21.60%	78.20%	81.70%	7.01%
4.5-years old	-0.01 (0.33)	3.02 (1.84)	21.10%	79.00%	73.80%	8.94%
7 to 8-years-old	-0.02 (0.30)	3.36 (2.17)	19.30%	74.00%	61.30%	9.44%
Type of Day						
Weekday	—	2.99 (1.90)	20.40%	78.70%	69.80%	8.86%
Weekend	—	3.98 (2.19)	21.40%	74.30%	77.50%	7.79%

Note.

Table 3

Bayesian Multilevel Models of the Association Between Children's Temperamental Withdrawal and Daily Play Time

	Model Steps			
Parameters	1	2	3	4
Model Fit				
LOO-CV Estimate	2993.50	2937.60	2938.50	2936.90
LOO-CV SD	45.60	45.90	45.70	45.60
LOO-CV Change	—	-55.90	-55.00	-56.60
Random Estimates				
Intercept-Child	0.90 (0.10)	0.90 (0.10)	0.90 (0.10)	0.88 (0.10)
Error	1.84 (0.05)	1.77 (0.05)	1.77 (0.05)	1.76 (0.05)
Fixed Estimates				
Intercept	3.27 (0.11)	2.96 (0.34)	3.00 (0.33)	2.96 (0.33)
Country				
Italy	—	0.04 (0.32)	0.06 (0.33)	-0.05 (0.33)
Netherlands	—	0.92 (0.37)	0.91 (0.36)	0.91 (0.36)
Spain	—	0.01 (0.33)	0.01 (0.33)	0.02 (0.33)
Sweden	—	0.55 (0.33)	0.52 (0.33)	0.50 (0.32)
Age				
4.5 Years-Old	—	-0.58 (0.27)	-0.59 (0.27)	-0.58 (0.26)
7 to 8 Years-Old	—	-0.31 (0.28)	-0.34 (0.28)	-0.29 (0.27)
Gender				
Male	—	0.07 (0.22)	0.04 (0.22)	0.06 (0.22)
Weekend		1.04 (0.14)	1.04 (0.14)	1.04 (0.14)
Withdrawal	—	—	-0.32 (0.35)	-0.26 (0.75)
Withdrawal x Italy	—	—	—	1.95 (1.10)
Withdrawal x Netherlands	—	—	—	0.33 (1.32)
Withdrawal x Spain	—	—	—	-0.70 (0.99)
Withdrawal x Sweden	—	—	—	-0.98 (1.01)

Note. Random estimates are standard deviations.

Table 4

Bayesian Multilevel Logistic Model of Association Between Withdrawal and United States Parent Interview Themes and Codes

Themes	Code Applied	Parameters		Predicted Probabilities		
		α_{mean} (SD)	β_{mean} (SD)	Non-Shy	Average	Shy
Child Shyness						
Child is Shy	39%	-0.52 (0.47)	1.10 (1.25)	26%	37%	50%
Child is Sociable	33%	-0.66 (0.45)	0.85 (1.15)	26%	34%	44%
Caretaker Psychology Themes (Importance of …)						
Children's Play	22%	-0.96 (0.51)	0.61 (1.14)	22%	28%	34%
Daily Routines	39%	-0.43 (0.46)	-0.86 (1.35)	50%	39%	30%
Family Time	50%	-0.13 (0.46)	-0.68 (1.25)	55%	47%	39%
Peer Interactions	50%	-0.22 (0.46)	0.97 (1.18)	34%	45%	56%
Social Skills	33%	-0.64 (0.45)	0.46 (1.06)	30%	35%	40%
Time Outside	17%	-1.17 (0.57)	0.93 (1.26)	17%	24%	33%
Physical and Social Settings						
Alone	44%	-0.34 (0.44)	0.52 (1.05)	36%	42%	48%
Family	72%	0.41 (0.52)	0.70 (1.23)	52%	60%	68%
Home	11%	-1.28 (0.58)	-0.14 (1.29)	23%	22%	21%
Outside	56%	0.02 (0.48)	-0.64 (1.22)	58%	51%	43%
Peers	67%	0.29 (0.48)	0.18 (1.12)	55%	57%	59%
Types of Play						
Constructive	39%	-0.44 (0.45)	-0.44 (1.14)	56%	39%	34%
Imaginative	44%	-0.30 (0.44)	-0.12 (1.07)	44%	43%	41%
Physical	56%	-0.02 (0.45)	0.13 (1.07)	48%	50%	51%
Toys	50%	-0.19 (0.45)	0.54 (1.08)	39%	45%	52%

Note. n = 18 U.S. parents. Child withdrawal scores: Mean = 0.00, SD = 0.32. -1.5 SD score (Non-Shy) = -0.48, 1.5 SD (Shy) = 0.48.

Table 5

Reformulation of Harkness et al. (2011)'s Table of Children's Time Spent in Various Activities in an Average Day (Hours)

Activity Categories	Italy	Netherlands	Spain	Sweden	U.S.	Average Time
Harkness et al. (2011) information						
Play	2.68	3.91	2.42	3.25	2.46	2.94
Watch TV	0.73	0.52	0.46	0.82	0.95	0.70
Other	0.61	0.32	0.59	0.82	0.41	0.55
Total daily time	13.35	12.23	13.15	13.53	12.76	13.00
Reformulation of time in activities						
Child discretionary time	4.02	4.75	3.47	4.89	3.82	4.19
Parent mandated time	9.33	7.48	9.68	8.64	8.94	8.81

Note.

Figure 1
Effect of Withdrawal on Daily Play Time
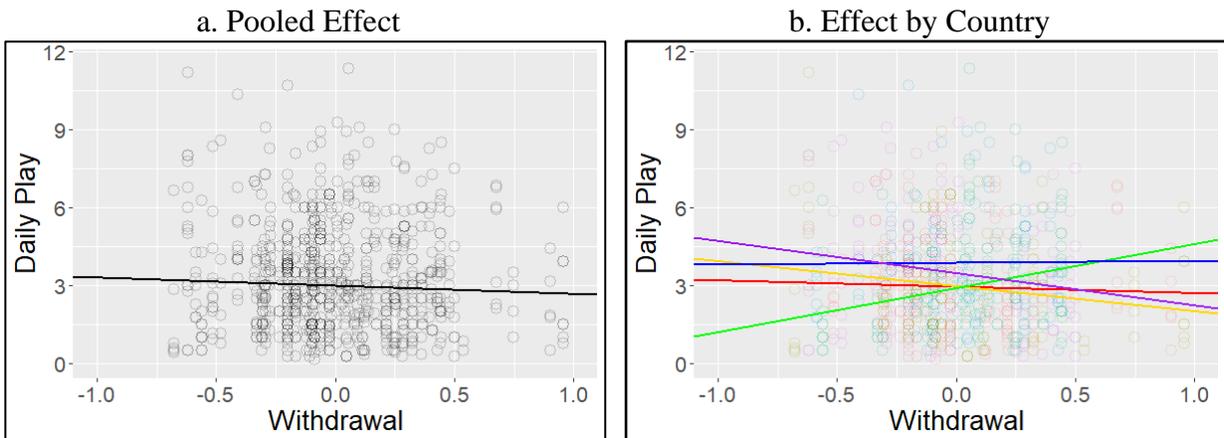
Note. Y-axes is on the hour scale. Plot a: Effect of withdrawal across the whole sample. Plot b: Effect of withdrawal for each country. Italy = green, Netherlands = blue, Spain = gold, Sweden = purple, U.S. = red.

Appendix A

Bayesian Multilevel Models of the Association Between Children's Temperamental Withdrawal and Probability of Playing Outside

Parameters	Model Steps			
	1	2	3	4
Model Fit				
LOO-CV Estimate	1967.40	1968.20	1969.30	1972.00
LOO-CV SD	51.90	52.60	52.70	53.20
LOO-CV Change	—	+0.80	+1.90	+4.60
Random Estimates				
Intercept-Child	1.04 (0.12)	1.03 (0.12)	1.05 (0.13)	1.07 (0.13)
Intercept-Day	0.43 (0.19)	0.45 (0.19)	0.45 (0.19)	0.47 (0.18)
Fixed Estimates				
Intercept	-1.76 (0.14)	-1.63 (0.38)	-1.64 (0.39)	-1.62 (0.39)
Country				
Italy	—	-0.73 (0.39)	-0.74 (0.40)	-0.80 (0.41)
Netherlands	—	0.67 (0.39)	0.68 (0.40)	0.70 (0.40)
Spain	—	-0.08 (0.39)	-0.08 (0.41)	-0.08 (0.41)
Sweden	—	-0.00 (0.37)	-0.01 (0.37)	0.01 (0.38)
Age				
4.5 Years-Old	—	-0.16 (0.30)	-0.15 (0.31)	-0.19 (0.31)
7 to 8 Years-Old	—	-0.47 (0.33)	-0.46 (0.33)	-0.52 (0.33)
Gender				
Male	—	0.14 (0.25)	0.15 (0.26)	0.12 (0.28)
Weekend	—	0.12 (0.14)	0.12 (0.14)	0.12 (0.14)
Withdrawal	—	—	0.01 (0.41)	-0.93 (0.90)
Withdrawal x Italy	—	—	—	1.57 (1.46)
Withdrawal x Netherlands	—	—	—	0.71 (1.45)
Withdrawal x Spain	—	—	—	1.14 (1.24)
Withdrawal x Sweden	—	—	—	1.32 (1.20)

Note. Random estimates are standard deviations.

Appendix B

Bayesian Multilevel Models of the Association Between Children's Temperamental Withdrawal and Probability of Playing at Home

Parameters	Model Steps			
	1	2	3	4
Model Fit				
LOO-CV Estimate	1998.60	1994.20	1995.50	1999.20
LOO-CV SD	50.40	50.90	51.00	51.60
LOO-CV Change	—	-4.40	-3.10	+0.60
Random Estimates				
Intercept-Child	1.15 (0.13)	1.11 (0.13)	1.12 (0.13)	1.16 (0.14)
Intercept-Day	0.88 (0.15)	0.91 (0.15)	0.92 (0.15)	0.94 (0.15)
Fixed Estimates				
Intercept	1.52 (0.14)	2.24 (0.42)	2.23 (0.43)	2.21 (0.43)
Country				
Italy	—	-0.83 (0.40)	-0.83 (0.41)	-0.83 (0.42)
Netherlands	—	0.47 (0.45)	0.48 (0.45)	0.48 (0.46)
Spain	—	-0.58 (0.43)	-0.58 (0.43)	-0.57 (0.43)
Sweden	—	-0.68 (0.40)	-0.67 (0.40)	-0.67 (0.41)
Age				
4.5 Years-Old	—	-0.17 (0.32)	-0.17 (0.32)	-0.15 (0.35)
7 to 8 Years-Old	—	-0.52 (0.34)	-0.52 (0.34)	-0.49 (0.36)
Gender				
Male	—	0.09 (0.27)	0.09 (0.27)	0.14 (0.30)
Weekend	—	-0.36 (0.15)	-0.36 (0.16)	-0.37 (0.16)
Withdrawal	—	—	0.09 (0.42)	0.56 (0.99)
Withdrawal x Italy	—	—	—	-0.48 (1.43)
Withdrawal x Netherlands	—	—	—	-0.72 (1.70)
Withdrawal x Spain	—	—	—	-0.56 (1.34)
Withdrawal x Sweden	—	—	—	-0.61 (1.30)

Note. Random estimates are standard deviations.

Appendix C

Bayesian Multilevel Models of the Association Between Children's Temperamental Withdrawal and Probability of Playing with Family Present

	Model Steps			
Parameters	1	2	3	4
Model Fit				
LOO-CV Estimate	1514.00	1549.70	1541.70	1546.40
LOO-CV SD	50.40	53.60	53.20	53.90
LOO-CV Change	—	+35.70	+27.70	+32.40
Random Estimates				
Intercept-Child	2.46 (0.26)	1.62 (0.21)	1.64 (0.20)	1.71 (0.23)
Intercept-Day	0.92 (0.16)	0.96 (0.16)	0.95 (0.16)	0.97 (0.17)
Fixed Estimates				
Intercept	2.33 (0.28)	2.88 (0.62)	2.83 (0.61)	2.95 (0.65)
Country				
Italy	—	0.07 (0.56)	0.05 (0.56)	0.13 (0.61)
Netherlands	—	-3.62 (0.62)	-3.59 (0.61)	-3.64 (0.64)
Spain	—	1.06 (0.63)	1.10 (0.62)	1.20 (0.67)
Sweden	—	0.69 (0.58)	0.74 (0.56)	0.72 (0.60)
Age				
4.5 Years-Old	—	-0.44 (0.49)	-0.43 (0.50)	-0.37 (0.53)
7 to 8 Years-Old	—	-1.59 (0.50)	-1.56 (0.50)	-1.60 (0.53)
Gender				
Male	—	-0.03 (0.40)	-0.01 (0.39)	-0.18 (0.44)
Weekend	—	0.81 (0.02)	0.80 (0.20)	0.81 (0.20)
Withdrawal	—	—	0.65 (0.66)	0.06 (1.48)
Withdrawal x Italy	—	—	—	-0.67 (2.11)
Withdrawal x Netherlands	—	—	—	1.55 (2.38)
Withdrawal x Spain	—	—	—	2.17 (2.18)
Withdrawal x Sweden	—	—	—	0.19 (1.96)

Note. Random estimates are standard deviations.

Appendix D

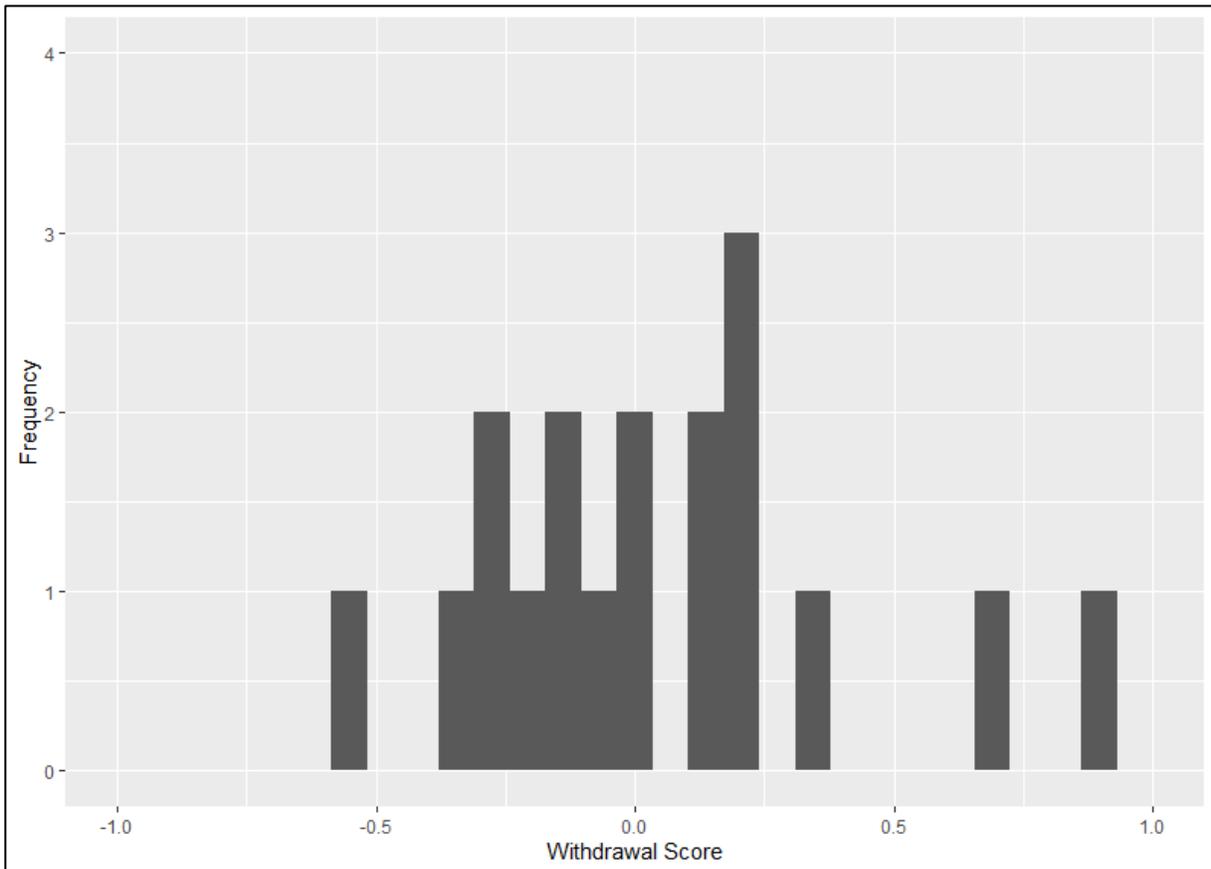*Bayesian Multilevel Models of the Association Between Children's Temperamental Withdrawal and Probability of Playing with Peers Present*

	Model Steps			
Parameters	1	2	3	4
Model Fit				
LOO-CV Estimate	1000.00	992.70	995.50	996.60
LOO-CV SD	50.40	50.50	50.60	51.10
LOO-CV Change	—	-7.30	-4.50	-3.40
Random Estimates				
Intercept-Child	1.32 (0.20)	1.32 (0.22)	1.34 (0.23)	1.41 (0.25)
Intercept-Day	1.01 (0.24)	1.11 (0.25)	1.11 (0.25)	1.16 (0.25)
Fixed Estimates				
Intercept	-2.93 (0.24)	-3.68 (0.60)	-3.70 (0.60)	-3.73 (0.62)
Country				
Italy	—	0.62 (0.53)	0.60 (0.52)	0.67 (0.56)
Spain	—	-1.15 (0.63)	-1.17 (0.64)	-1.26 (0.68)
Sweden	—	0.95 (0.52)	0.95 (0.52)	0.99 (0.54)
Age				
4.5 Years-Old	—	0.29 (0.47)	0.29 (0.48)	0.26 (0.50)
7 to 8 Years-Old	—	0.91 (0.49)	0.92 (0.47)	0.89 (0.49)
Gender				
Male	—	0.17 (0.38)	0.20 (0.40)	0.14 (0.43)
Weekend	—	-0.34 (0.26)	-0.35 (0.25)	-0.35 (0.25)
Withdrawal	—	—	0.18 (0.63)	-0.81 (1.41)
Withdrawal x Italy	—	—	—	0.72 (1.90)
Withdrawal x Spain	—	—	—	1.91 (2.08)
Withdrawal x Sweden	—	—	—	1.24 (1.76)

Note. Random estimates are standard deviations.

Appendix E

Histogram of 18 U.S. Parent Interview Withdrawal Scores

Note.