Preschoolers' Responses to Prosocial Opportunities During Naturalistic Interactions with Peers: A Cross-Cultural Comparison

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Abstract

The goal of this study was to better understand similarities and differences in preschool children's expression of needs and prosocial responsiveness to peers' needs across two culturally distinct contexts. Preschoolers were observed in a semi-naturalistic design across rural Mexico and urban Canada, wherein they were instructed to build a tower with blocks. Three- to 6-year-olds (N = 306; 48% female) were divided into 64 peer groups. We coded for children's expression of needs (instrumental, material, or emotional), responses to prosocial opportunities (prosociality, denial, or no response), prosociality without an apparent need (spontaneous prosociality), and types of prosocial behavior (helping, sharing, or comforting). While instrumental and material needs were expressed similarly across both samples, Tzotzil Maya children expressed fewer emotional needs than Canadian children. Failing to respond to others' needs, followed by denial, were the most frequent need-provoked response in both countries; surprisingly, only 9% of needs received a prosocial response. Though need-provoked prosociality was rare in both cultural contexts, children engaged in considerable spontaneous prosociality which varied as a function of age, gender, and cultural context. Lastly, Canadian more than Tzotzil Maya children denied emotional and instrumental needs (but not material needs). The findings inform how cultural practices may shape the presentation of needs and prosocial responsiveness in peer interactions.

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Acting prosocially on behalf of others is a common, universal, and relatively unique human behavior that is associated with a diversity of positive developmental outcomes (Eisenberg et al., 2015). Although both biological dispositions (Knafo & Plomin, 2006) and sociocultural factors (Köster & Kärtner, 2019) have been implicated in its emergence and development, there is still considerable debate about how the process of prosocial development unfolds (e.g., Dahl, 2018a). Indeed, children in most cultures engage in at least some prosocial behaviors, nevertheless, variations in the types, frequencies, and associated processes are evident at both the individual and cultural levels (Callaghan & Corbit, 2018; Eisenberg et al., 2015).

Despite a massive, recent increase in the study of prosocial behavior generally, and a modest increase in the study of prosocial behavior cross-culturally, the expression of needs — which is thought to be a crucial elicitor of early prosociality (Dunfield, 2014) — has received little attention in either Western, Educated, Industrialized, Rich, Democratic (WEIRD) populations (Henrich et al., 2010) or other cultural contexts. Laboratory-based studies on the emergence of prosociality suggest that the presence of a need is an integral part of early prosocial engagement (Warneken & Tomasello, 2006). In well-controlled experimental work, observable needs elicit prosociality (e.g., Dunfield et al., 2011). Yet, it is unclear whether the expression of needs serves as a similarly salient cue in naturalistic contexts. There are multiple reasons why examining the role of needs in children's prosociality within their sociocultural milieus is important; in naturalistic settings, needs are multifaceted and can be manifested in more or less explicit ways, or even inferred in the absence of observable cues (e.g., Tavassoli et al., 2019).

Additionally, there are cultural variations in the communication of needs and expected responses that make the applicability of experimental studies to children's lived experiences unclear.

More generally, an overreliance on structured tasks limits our understanding of the role of social factors in the development of prosociality, because these tasks typically involve children interacting with novel adults. Yet young children are rarely relied upon to spontaneously aid the adults in their life, *especially* if those adults are strangers. In contrast, children spend a considerable amount of time interacting with familiar peers in educational settings (Rubin et al., 2005), where similar developmental levels and a shared history of reciprocal interactions make the possibility of providing effective and necessary aid more likely. Naturalistic studies can provide a fuller picture of social dynamics wherein prosocial behaviors occur. Constructivist theorists have long argued that such prosocial opportunities in children's everyday interactions may support the development of prosocial competence (Carpendale & Lewis, 2015). As a result, naturalistic interactions with peers constitute a fruitful but understudied context for examining prosocial development (e.g., Fabes et al., 2012). This study sought to contribute to scholarship on prosocial development by examining the expression of needs and prosocial responses with peers in a semi-naturalistic context across two distinct cultural milieus.

Development of Prosocial Behaviors in Cultural Context

Prosociality refers to voluntary acts intended to benefit others. Prosocial behaviors are thought to respond to specific types of needs; that is, helping, comforting, and sharing are elicited in response to instrumental, emotional, and material needs, respectively (Dunfield, 2014). Starting in the second year, toddlers recognize others' needs and are motivated to alleviate them (e.g., Rheingold, 1982; Warneken & Tomasello, 2006). Precocious manifestations of prosocial intent gave rise to the proposal that children are born with altruistic tendencies (i.e., the

Natural Tendency view; Warneken & Tomasello, 2009). Yet children's prosocial behavior occurs within their rich histories of social interactions and is likely influenced by their desires to engage with others (i.e., the *Social-interactional view*; Rogoff, 2003). Indeed, developmental change in prosociality is inevitably driven by coactions between contextual factors and biological predispositions that build on each other (Dahl, 2018a). Recently, Köster and Kärtner (2019) argued that four intertwined developmental processes contribute to children's prosociality: i) social human nature, ii) social cognition, iii) social interaction, and iv) cultural learning. According to this developmental systems perspective, the emergence of prosociality is grounded in the basic motives that characterize humans' social nature such as affiliation and empathic concern, as well as socio-cognitive developments in understanding others' needs and capacities to help. Over development, these motives are refined through interaction with others within a particular cultural milieu (Super & Harkness, 1986).

Despite the considerable variations in human culture, most findings regarding children's prosociality—as with many areas of research—are derived from samples of participants who are from WEIRD backgrounds (Henrich et al., 2010). Nevertheless, there is evidence suggesting substantial variations in prosocial development across distinct social contexts (Callaghan & Corbit, 2018). For example, Western societies may be unique in the extent to which children avoid or are excused from helping their parents with chores (Whiting & Whiting, 1975), underlining striking variability in the culture-specific practices, beliefs, and values regarding children's need to be helpful (Lancy, 2018). Prosocial opportunities and expectations in particular cultural settings may be linked to children's sensitivity to others' needs in specific social-relational contexts. Yet, little is known about cultural variability in the expression of the

various needs (i.e., instrumental, material, and emotional) that provoke peer-directed prosociality or how peers' expressions of need are responded to in naturalistic settings.

Children's Helping Across Cultures

Helping others complete simple goal directed behaviours is one of the first ways children act prosocially (e.g., Warneken & Tomasello, 2006). Children from a variety of cultural backgrounds start helping at similar ages (Callaghan et al., 2011), however, the subsequent development of helping varies cross-culturally (e.g., Alcalá et al., 2014; Callaghan et al., 2011). For instance, children from Western communities tend to become more selective and strategic with their helping from early to middle childhood (e.g., House et al., 2013; Sierksma et al., 2014). In contrast, children from the indigenous-heritage community in Mexico remain generally helpful across the school-aged years (Alcalá et al., 2014; Coppens et al., 2014). Further, cultural variations in the *forms* of early helping have been documented; rural Peruvian and Indian children helped more with household chores such as cooking and cleaning, whereas rural Canadian children engaged in more self-helping behaviors such as dressing and putting away toys (Callaghan et al., 2011). Thus, consistencies in the emergence of helping exist alongside cultural variations in the forms and developmental trajectories of helping.

Less is known about variability in the cues children use to recognize instrumental needs. In an out-of-reach helping protocol, Aime et al. (2017) found that 80% of Vanuatuan 2- to 5-year-olds helped others when their need was explicit (i.e., reaching for an object), but only 50% helped proactively in the absence of an explicit request. In contrast, by the age of 2, 75% of American children engaged in proactive helping (Warneken, 2013). Across cultures, then, children were similarly likely to help when instrumental needs are explicit, but the frequency of helping varied in the absence of explicit cues.

Children's Sharing Across Cultures

Like helping, the emergence of sharing seems to follow a similar trend across cultures in early childhood, becoming more culture specific with age (Blake et al., 2015; Corbit et al., 2020; House et al., 2013). For example, across various cultures, 3-year-olds tend to self-maximize (i.e., by keeping most of the candies for themselves), whereas 5-year-olds produce more equitable divisions (Rochat et al., 2009). This age-related shift was replicated in a sample of Tibetan Buddhist children raised in a cultural context that emphasizes compassion for others and self-minimizing (Robbins et al., 2016). Beyond early childhood, children's sharing may be influenced by cultural practices that shape their understanding of others' material needs and prescriptive beliefs surrounding fairness and equity. For instance, when distributing prizes, most 4- to 11-year-old German children divided the prizes based on merit, Namibian children raised in an egalitarian society divided the prizes equally, and half of the Kenyan children raised in a status-based society kept the majority of the prize for themselves (Schäfer et al., 2015).

Children's responsiveness to cues indicative of others' material needs has received little attention cross-culturally. Rao and Stewart (1999) reported that 4-year-old American children explicitly requested that others share with them more than Indian and Chinese children, suggesting that the cultural context within which children are socialized may shape how material needs are expressed, evaluated, and addressed.

Children's Comforting Across Cultures

Compared to helping and sharing, comforting is understudied across cultures. Kärtner and colleagues (2010) found that 19-month-old German and Indian children were equally likely to comfort an adult experimenter who demonstrated distress after breaking her toy. Whereas Trommsdorff and colleagues (2007) found that 5-year-old German and Israeli children

comforted a distressed adult experimenter more than Malaysian and Indonesian children. Although children may have a general proclivity to comfort others, these tendencies may be honed over development to reflect culture-specific conventions.

A related question is: what role does culture play in *opportunities* to comfort? Comforting is a response to an observed negative emotional state (Dunfield, 2014), thus cultural variations in comforting might stem from differences in the expression of and expected responses to emotional displays. Expressions of emotion may be subtler in cultures where emotional moderation and social harmony are valued over individual expression. For instance, Nepali children raised in a culture where stoicism is valued reported feeling "just OK" in emotionally challenging situations and frequently reported avoidant responses (e.g., ignoring or moving away; Cole & Tamang, 1998). Moreover, in Tzotzil Maya culture, caregivers encourage children's self-soothing skills, and therefore, children are less likely to display emotional needs due to relatively mature emotion regulation abilities (Gaskins, 2020; Lancy, 2018). Indeed, cultural variability in opportunities to express emotional needs may be integral to the development of comforting behaviors.

In sum, although there is relative consistency in the age at which prosocial behaviors emerge, subsequent development appears to vary across cultures based on the type of prosociality and context in which it occurs. Thus, this study aims to explore how needs are expressed and responded to across diverse socio-cultural contexts in a semi-naturalistic peer context.

Diverse Socio-Cultural Contexts

The question is no longer *whether* the social context influences prosocial behaviors, but rather *how* (Dahl, 2018b). Cross-cultural studies have predominantly examined *between*-culture

variability via broad classifications such as Western, urban, middle-class (i.e., WEIRD populations) vs. rural farming communities, or autonomy vs. relatedness (e.g., Keller, 2012). These cultural classifications fail to capture *within*-culture variability in children's prosocial behaviors. In the case of autonomy, for instance, the difference between cultural contexts is not whether autonomy is present or absent, but rather where and how autonomy is privileged and practiced. In this sense, the developmental niche model (Super & Harkness, 1986) may have more explanatory power because it highlights children's physical and social settings, customs of child rearing, and caretakers' psychology as three subsystems that influence children's development *within* the larger culture. This account focuses on the individual, viewing the subsystems as mediating between the child and their cultural environment. Physical and social settings play a crucial role in guiding children's social behaviors as these contexts afford varied opportunities for social interactions. Similarities observed in the behavioural tendencies of individuals within a culture are attributed to the systematic regularities that children's varied experiences within cultural contexts provide. Together, these models highlight the myriad ways that culture can shape variability of prosocial behaviour both within and between cultures. For comparative purposes, then, this study contrasted peer interactions in preschool educational settings among children from Canada and those from Tzotzil Maya communities in Mexico.

The Culture Specificity of Maya Children's Early Social Interactions

Traditionally, Maya communities are agriculture based and children take part in the economic production of their family (Gaskins, 2006a; Kramer, 2005). From a young age, Maya children help parents by participating in domestic work that they are assigned (Gaskins, 2020; Martínez-Pérez, 2015) or identify through independent initiative (Alcalá et al., 2014; Coppens & Rogoff, 2021). Such prosocial initiatives among Maya children may support their autonomy and

competence (de Leon, 2015). Starting as young as age 2, Maya children spontaneously take on the responsibility of caring for younger siblings and teaching everyday tasks such as weaving, washing, and cooking at home (Martínez-Pérez, 2015; Maynard, 2002). Maya children are expected to be attentive and responsive to others' needs without being asked - a cultural value called *Acomedido* (Alcalá et al., 2018; López et al., 2015). Thus, unlike WEIRD participants whose family-based helping typically involves self-directed behaviours (e.g., cleaning up one's own toys; Callaghan et al., 2011), Maya children predominantly use prosocial behaviours to "make their way within their social world" by supporting family needs (de Leon, 2015, p. 158). Maya children view chore assignment positively since it demonstrates caregiver confidence in the child's competence (Gaskins, 2020), and describe a sense of belonging and responsibility to the family in explaining why they take initiatives in spontaneously contributing to family chores (Alcalá et al., 2021). While Maya children's prosociality is well-documented at home, over the last decade, Tzotzil children increasingly attend preschool and on a more regular basis, affording different social interactions than the home context (Gaskins, 2020). Thus, peer interactions in preschool settings are an important context in which to further study this community.

The Present Study

To our knowledge, this is one of the first studies to examine children's responsiveness to naturalistic expressions of need by peers across cultures. We aimed to explore similarities and differences between rural Tzotzil Maya and urban Canadian participants on (1) the expression of needs in peer interactions, and (2) responsiveness to peers' manifestation of needs. We also examined whether these variations across cultural contexts were moderated by children's age and gender.

We hypothesized that Maya children would show fewer needs than Canadian children, as they are more likely to be socialized to take care of their own needs independently (de Leon, 2015). Cultural differences were expected to be most pronounced in the presentation of emotional distress (Gaskins & Miller, 2009), as Maya children are generally discouraged from strong emotional displays (Gaskins, 2006b).

We had competing hypotheses about cultural variations in children's responsiveness to others' needs. Given that Maya children participate in household chores and take care of younger children from early in life (e.g., Kramer, 2005), they may be more attuned and responsive to others' needs, showing higher rates of prosocial behaviors (especially spontaneous prosociality) and low rates of unresponsiveness compared to Canadian children. Conversely, since expressing and responding to emotional distress is less common in Maya culture (Corsaro, 2009), it may be that Tzotzil Maya children (as compared to Canadian children) might be less likely to intervene on emotional needs. Finally, although, Tzotzil Maya children willingly share resources with relatives (e.g., Gaskins, 2020), they may be less likely to respond to peer's material needs than Canadian children because resources are more limited in Maya communities (Kramer, 2005) and addressing peers' material needs may be viewed as more costly. Together, the results of this study will provide insight into how a diversity of needs are expressed and responded to across two distinct cultural milieus of development.

Method

Participants

The study received IRB approval from the Office of Research Ethics at Concordia University (# 30005525). Participants were part of a larger multi-method examination (Dunfield & Kleis, 2018) that included structured observations and questionnaires, which are not reported

here. The research team first sought permission from the Indigenous Council of Education in Zinacatan, Chiapas, then contacted the principals (and subsequently teachers) at two local schools seeking permission to contact families and collect data on-site. Parents of all children enrolled at participating schools were contacted to provide written informed consent (or verbal informed consent in some Tzotzil Maya families). Data were collected from all consented participants in Chiapas Mexico. We sought to match our Montreal sample as closely as possible to the characteristics of the Tzotzil sample. Once a school had been contacted, we attempted to recruit all eligible children and tested all consented participants.

The final sample included 306 preschoolers who resided in rural and semi-rural areas in Zinacantan, Chiapas, Mexico (n = 167) a region populated by the ethnic Tzotzil group and urban areas in Montreal, Quebec, Canada (n = 139). Children were recruited and observed across two preschools in Zinacantan and ten preschools in Montreal. Due to differences in the structure of formal education and variations in the number of students per class, differences in the number of schools recruited were unavoidable. Both samples attended preschool on a full-time basis. Participants' ages ranged from 3 to 6 years in both Mexico (M = 4.71, SE = .85; n 3-year-old = 13, n 4-year-old = 52, n 5-year-old = 72, n 6-year-old = 30) and Canada (M = 3.95, SE = .92; n 3-year-old = 54, n 4-year-old = 46, n 5-year-old = 31, n 6-year-old = 8). Approximately half of the children were female in both contexts (Mexico = 47% female; Canada = 49% female). While all Mexican children in our sample were Tzotzil Maya, 70% of the Canadian sample who reported on ethnicity identified themselves as European descent and the rest were non-European or from mixed heritage backgrounds (e.g., Lebanese-Peruvian, Arab-Hungarian), consistent with Canadian demographics (Statistics Canada, 2017). Tzotzil families spoke Tzotzil at home and

Spanish at school. Montreal children spoke English and/or French at school, but some also spoke a third language at home.

Children were assigned to groups based on their age and classroom (*n* Groups = 64). The number of children in each group ranged from 3 to 7, due to variation in class size, children's absence, or lack of parental consent (*n* Group of 3 = 5*, n* Group of 4 = 16*, n* Group of 5 = 34*, n* Group of 6 = 6*, n* Group of 7 = 3).

Procedure

Children were video-recorded during semi-naturalistic interactions with their peers. Individual playgroups were recorded from two opposing angles to facilitate observations. Two research assistants (local to each site) were present during testing; they only interacted with the participants to redirect them back to the testing area if participants left the space. Only two children in Mexico left the recording area during observation; responses during that period were coded as "unaware" and excluded from the analyses. The research assistants were unknown to the participants at both sites. The research assistants in Mexico were not Tzotzil, but they resided in the nearby town, San Cristóbel de las Casas, had experience working with Tzotzil children in educational settings, and could speak some Tzotzil. Participants were accustomed to interacting with non-Tzotzil adults at school. Research assistants in Montreal were bilingual (French/English) students enrolled at an English-speaking University and had experience working with children in a research setting.

Following a 10-minute warm up period where groups were given an opportunity to engage in unstructured free-play, they were given a multipiece wooden block set (100 pieces in Mexico and 150 pieces in Canada) and instructed to "build the tallest tower you can". Children had 10 minutes, uninterrupted, to play as they wished. At the end of the study, all children in

participating classrooms received a small gift and participants received a certificate. Pedagogical materials were donated to participating schools in Chiapas.

The current analyses focus on children's responsiveness to prosocial opportunities during block play. Although block play might be less common among Tzotzil than Canadian children, all participants had familiarity with blocks through the school. Due to differing group sizes, if participants chose to distribute the blocks equally, the number of blocks per child varied across groups (16.6 to 50 blocks per child). Importantly, however, across groups, it was common for blocks to be left in the bucket or a communal pile, suggesting ample blocks per group. Nevertheless, the number of blocks per child (i.e., group size/number of blocks) was included in analyses to ensure that this did not account for the observed findings[1].

Coding

The videos were coded using Mangold Interact software version 17.1.11.0. Based on prior literature, needs were coded as instrumental, material, and/or emotional (Dunfield et al., 2011; Dunfield, 2014). Coded needs included observable occurrences (e.g., a tower falling down), as well as children's nonverbal cues (e.g., facial expressions; pointing or reaching), or verbal statements (e.g., "oh, my tower is broken") and requests (e.g., "can I have some pieces?"). Instrumental need referred to difficulty in completing a goal directed behavior (e.g., tower breaking/falling down); material need was defined as not having/not being able to acquire a desired resource (e.g., "give it to me"); emotional need referred to a negative emotional state such as yelling or showing facial cues indicating distress such as frowning. No child cried during the block play. When a child manifested a need, we coded how other group members responded

[1] The same analyses were conducted with group size instead of blocks per child and the pattern of results did not change.

to that need. Responses to needs were coded as (1) "*prosocial*", when children addressed another's need, (2) "*denial*", when children rejected an opportunity to be prosocial by disagreeing ("No"), resisting to give an object, providing reasoned argumentation ("you can't have the green one because you are supposed to use only the blue ones"), or laughing and teasing the person in distress, (3) "*no response*" when children noticed a need but ignored it (i.e., direct line of sight but no reaction), or (4) "*unaware*", when children did not notice that there was a need (i.e., positioned such that it was improbable that the child could observe the need). Response analyses were limited to instances where the expressed need was noticed (i.e., unaware instances were excluded). Prosocial behaviors could also occur spontaneously in the absence of an observable need. For example, in one instance, a child was independently building a tower and another offered one of her own blocks without being asked to do so. Since the initiating need was not apparent, this instance was coded as spontaneous prosociality. When children engaged in prosocially, the type of prosocial behavior was further coded as helping (e.g., assisting another child to re-build a tower after it crashed), sharing (e.g., giving up some blocks to another child), or comforting (e.g., hugging, asking "are you ok?"). Instances of collaboration (i.e., building a tower together) were not coded as prosociality. A complete coding manual is available in the Supplementary Materials.

Interobserver reliability was established by having an independent observer code a subset of the videos (16 out of 64 groups of children, 25%). Both naïve coders were neither Canadian-born nor Tzotzil (both originated from South America), and were fluent in English, French, and Spanish. The percentage of agreement for identifying children's needs was 77%. Cohen *Kappas* were calculated for types of needs (k = .92), types of responses (k = .84), and types of prosocial behaviors (k = .96).

Analytic Approach

Because children were nested within peer groups, multilevel modeling (MLM) was conducted using linear mixed effects modeling (Rabe-Hesketh & Skrondal, 2012) in Stata 15.0. Maximum likelihood was used for estimation and Akaike's information criterion (AIC) was used for evaluating model fit. Following Hox et al. (2017), the same model building procedure was used for each analysis. First, an unconditional model was specified and an intraclass correlation coefficient (ICC) was computed to estimate the proportions of variance between peer groups (level-2). Predictors were subsequently added to the models, including both main effects and interactions of predictors with cultural context; non-significant fixed effects ($p > 0.05$) were trimmed, and the best model fit was selected. This method allowed us to examine within-group predictors such as age and gender as well as between-group predictors such as cultural context. Dummy variables were computed for categorical predictors (e.g., types of needs); to facilitate interpretation, models were constructed for each of the categories as the referent. Descriptive information about variables is included in the Supplementary Materials (Table S1). Number of blocks per child (based on the group size) was added into all models to control for site differences in the number of blocks and variance associated with group size. Preliminary analysis indicated that including number of blocks per child in the models did not change the substantive pattern of findings reported below, except for the analyses of responding to prosocial opportunities and denial responses to needs. For parsimony, this variable was included only in those models and omitted from the other analyses.

Results

Children's Expressions of Needs

To estimate how much variability in children's expressions of needs was predicted by peer group, an unconditional model was tested (Table 1). The ICC value indicated that a small portion of the variability in children's expressions of needs (5%) was between peer groups. The best model fit indicated that gender (b = -.44, p = .004) and cultural context (b = -.46, p = .02) significantly predicted children's expressions of needs. However, these intercepts are based on the sums of the three types of needs (i.e., emotional, instrumental, and material); therefore, the analysis was repeated three times, with each of the three needs as the reference category to further disentangle the main effects (Table 1). Overall, children expressed instrumental needs significantly more than emotional needs, followed by material needs. Additionally, a main effect of cultural context was found. As hypothesized, cultural context significantly predicted expressing emotional needs; that is, Tzotzil Maya children expressed fewer emotional needs than Canadian children (Figure 1). Gender significantly predicted expressing instrumental needs (Table 1); girls expressed instrumental needs less than boys.

Individual Children's Responses to Prosocial Opportunities

The unconditional model showed that 12% of variability in children's responses to prosocial opportunities was predicted by peer group (Table 2). The best model fit indicated that cultural context (b = -2.126, p < .001) and number of blocks per child (b = -.055, p = .02) significantly predicted children's responses to prosocial opportunities. The analysis was repeated by holding each category of responses as the reference one at a time to clarify the differences between cultural contexts (Table 2). Overall, failing to respond to others' expressed needs (no response) occurred most frequently; the frequency of prosocial responses was not significantly different from denial. Moreover, cultural context significantly predicted variations across type of responses. As expected, cultural variations were particularly evident for failures to respond,

wherein Canadian children failed to respond to peers' needs *more* often than Tzotzil Maya children; cultural differences were of smaller magnitude for explicit responses to needs (i.e., denials, prosocial responses; Figure 2).

We considered whether the high rates of failing to respond (in both cultural contexts) might belie the extent to which needs were actually being met (see Philpot et al., 2020, for a similar point). Specifically, multiple children in the group could observe and respond to a single need, and as long as at least one child responded, the need could be alleviated. Therefore, we descriptively examined the proportion of needs in each group that were addressed or denied by *at least one* of the children in that group. Peer groups, rather than individual children within groups, were the unit of analysis (*N* groups = 64). Interestingly, this analysis indicated that only 8.7% of needs were addressed prosocially, whereas 40% of needs were denied by at least one of the children in the group.

Children's Responsiveness to Different Manifestations of Needs

Prosocial Responses to Needs

To estimate how much of the variability in children's prosocial responses to peers' needs was predicted by peer group, unconditional models were built for prosocial responses to different types of need (emotional, instrumental, material, and no apparent needs). Approximately 3% of the variability in children's prosocial responses to needs was between peer groups, indicating that a large portion of variability in prosociality was within groups. The best model fit (see Table S2 in Supplementary Materials) indicated that children's prosocial responses to needs were significantly predicted by gender (b = .45, p <.001), age (b = .22, p =.001), and the interactions of age by cultural context (b = -.24, p =.01), and gender by cultural context (b = -.52, p =.001). Children engaged in spontaneous prosociality (i.e., no apparent need; M = 1.51, SE =

.14) significantly more than prosociality that was provoked by material (M = .25, SE = .04), emotional (M = .16, SE = .03), or instrumental needs (M = .20, SE = .03). In general, contrary to our hypothesis, Canadian children engaged in spontaneous prosociality more than Tzozil Maya children, this difference became larger with age (Figure 3a) and was more evident among girls than boys (Figure 3b). Additional analyses examining differences between types of prosociality (i.e., helping, sharing, comforting) are available in Supplementary Materials (Table S4).

Denial Responses to Needs

The unconditional model indicated that 9% of the variability in children's denial of others' emotional, instrumental, and material needs was between groups. The best model fit showed that children's denial of others' needs was predicted by number of blocks per child (b = -.033, $p < .05$), age (b = .26, $p < .001$) and cultural context (b = -1.61, $p < .001$). Further analyses on types of needs that elicited denials (Table S3 in Supplementary Materials) indicated that instrumental needs were denied more than material needs, but not emotional needs. As age increased, children were more likely to deny emotional and instrumental needs. However, age did not predict denying material needs. Lastly, the findings showed that Canadian children denied emotional and instrumental needs (but not material needs) more than Tzotzil Maya children (Figure 4).

Discussion

In this study, our aim was to delineate similarities and differences in how Tzotzil Maya and Canadian preschoolers expressed diverse needs and responded to prosocial opportunities during semi-naturalistic interactions with peers. The bulk of variability in children's prosocial interactions was observed within rather than between groups, emphasizing the value of considering context-specific heterogeneity within cultures, alongside overall cultural trends.

Nevertheless, although children in both cultural contexts showed many similarities in their expressions of and responses to needs, findings did reveal some cultural differences. These results support theoretical perspectives highlighting the diversity of processes that influence the development of children's prosociality (e.g., Köster & Kärtner, 2019).

Children's Expressions of Need: Self-Expression varies by Culture

Across both cultural contexts, children frequently expressed needs (29.32 needs per group) and did so at similar relative frequencies, with instrumental needs occurring more often than emotional needs, followed by material needs. Since children were observed while attempting to build tall towers with an abundance of blocks, it is unsurprising that they experienced more instrumental (e.g., towers falling down) than material needs. Material needs were similarly low across cultures, and consistently the least frequent need displayed, suggesting that despite likely differences in the abundance of personal belongings across the two cultural contexts, the number of blocks provisioned was sufficient.

Consistent with our hypotheses and past research (Gaskins, 2006b; Gaskins & Miller, 2009), Tzotzil Maya children expressed fewer emotional needs than their urban Canadian counterparts. In Tzotzil Maya culture, expressions of emotions are inconsistent with values such as emotional moderation and social harmony (Cole & Tamang, 1998). Moreover, Tzotzil Maya parents encourage their children to be self-sufficient, such that toddlers are skilled in self-soothing, and relatively mature in regulating their emotions (Gaskins, 2020; Lancy, 2018); this may account for the finding that they displayed fewer emotional needs.

Importantly, although the prevalence of expressing instrumental and material needs was consistent across cultures, we did not assess whether these needs were communicated directly (e.g., "Give me the blue crayon") or indirectly (e.g., "I want to color the sky blue"; Tavassoli et

al., 2019). It is possible that the similar overall frequencies mask underlying communicative differences. A full understanding of how the representation of needs affects prosociality should consider the myriad ways in which needs are communicated. Cultural values such as modesty, and features of the social context in which needs are expressed, may influence the clarity of need expression (i.e., direct versus implied requests) leading to differences in subsequent prosociality.

More work is needed to further unpack the underlying processes such as socialization practices and cultural values that may influence the expression, perception, and responses to needs. This is especially important because inferences about others' needs may be the first step in engaging in prosociality (Dunfield, 2014). For instance, Tzotzil Maya parents expect their children to contribute to household chores (Gaskins, 2020; Martínez-Pérez, 2015), which leads children to become more attuned to others' needs, particularly in the absence of explicit cues, resulting in more opportunities to practice addressing needs of their family. In contrast, Western parents do not expect their children to contribute to chores and are not particularly appreciative of toddlers' helping (Hammond & Brownell, 2018; Rheingold, 1982). As such, being sensitive to others' needs may be viewed as a social obligation in one culture and a positive disposition in another. However, as is discussed further below, these patterns may also vary across relationship contexts, since processes in familial settings may not consistently generalize to peer interactions.

Children's Responses to Prosocial Opportunities Vary Cross-Culturally

Contrary to high rates of prosociality in structured laboratory tasks (e.g., Dunfield et al., 2011; Warneken & Tomasello, 2006), we found that most needs were not addressed, and that failing to respond was the most common reaction to others' needs. One potential explanation for the high rates of failing to respond could be the size of the peer groups, which resulted in multiple individuals who *could* respond to the need. With that in mind, we examined the

proportion of needs that were addressed by at least one child. Mitigating against this interpretation, rates of prosocial engagement remained low; only 9% of expressed needs were addressed, and more than 90% of prosocial opportunities were either denied (40%) or ignored. These findings are not unprecedented; previous naturalistic studies suggest that failing to respond to others' needs or actively refusing them are both common in children's day-to-day interactions with agemates (e.g., Tavassoli et al., 2020). Indeed, because needs likely occur frequently in peer interactions, children must be selective in deciding when prosociality is appropriate, especially in the absence of an explicit request. This aspect of prosocial exchanges, while evident in naturalistic observations, is largely overlooked in experimental studies.

Failing to respond to others' needs was qualified by a cultural difference. Canadian children failed to respond to observed needs more frequently than Tzotzil Maya children, although the rates of prosociality and denial were also somewhat higher in Canada than in the Maya community. Though Maya caregivers encourage children to participate in the daily work of the family (Gaskins, 2020; Martínez-Pérez, 2015), this autonomy may not consistently extend to structured educational settings (Rogoff et al., 2018). Furthermore, it is possible that the Canadian social ecology affords unique opportunities for children to gain experience managing peers' needs, as attending daycare is more common, particularly in Québec (Sinha, 2014).

Importantly, prosocial engagement was not limited to opportunities provoked by needs. Children in this sample engaged in more spontaneous prosociality (i.e., in the absence of an apparent need) than responsive prosociality (i.e., provoked by an observable need). This finding underscores the complexity of prosocial behavior in real life and suggests that although structured lab-based studies provide insights into prosocial *capabilities*, they may miss nuance that is better captured by naturalistic contexts (Dahl, 2017). Our data suggest that the presence of

explicit needs might not be the only, or even most salient, elicitor of prosocial responses in peer interaction. Thus, although the emergence of prosocial behaviour may rely on the ability to recognize others' needs (Dunfield, 2014), these results suggest that by 3 years of age, children frequently act prosocially in absence of observable cues. Because spontaneous prosociality occurs in the absence of observable needs, it may represent a more sophisticated form of prosociality, reflecting more advanced social cognitive understanding (Warneken, 2013). Spontaneous prosociality is not without its risks; prosociality based on inference in the absence of explicit cues may result in aid that is undesired or misguided. Alternatively, spontaneous prosociality may be motivated by internalized values and/or broader relational desires to promote social interaction or positive relationships (Dahl, 2018a; Köster & Kärtner, 2019), whereas responsive prosociality reflects more need-oriented reasoning (Eisenberg et al., 2015); in this respect, the underlying motivations for responsive and spontaneous prosociality might differ (Paulus, 2014). The high frequency of spontaneous prosocial behavior highlights the importance of applying diverse methods to the study of prosocial development and suggests an important avenue for future research.

Although our data indicated low rates of responsive prosocial behavior in both cultural contexts, Tzotzil Maya children were especially unlikely to respond prosocially to others. This was the case for both responsive and spontaneous prosociality. While this goes against *acomedido* among Maya families (López et al., 2014), these patterns with peers at school should not be assumed to generalize to all of Tzotzil Maya children's social interactions (Super & Harkness, 1986). In this study, we only observed children's prosocial behavior with peers during play; it is well documented that Maya children tend to spontaneously help with family responsibilities early in life (Gaskins, 2020; Kramer, 2005; Martínez-Pérez, 2015). Additionally,

schooling has been used as a colonization tool against indigenous communities in Mexico and helping in the classroom is reportedly punished by teachers (Rogoff et al., 2018), which might contribute to the low rates of peer-directed prosociality among Maya children at school. The distribution of ages in our sample also suggests that some of the Tzotzil Maya children may have started attending school later than the Canadian children. In this sense, Maya social ecologies may afford the children with less abundant and sustained experience with peer interaction in the preschool years (Rogoff, 2003), which could influence early prosocial development in this interpersonal context. More naturalistic work is needed to examine differences in prosocial behaviour across a range of contexts (e.g., school settings vs. community centers) and relationships (close friends vs. peers). Mirroring the different social configurations most commonly represented in children's daily life experiences may help future studies gain a fuller picture of how children's prosociality develops within their social environments.

Limitations

Some limitations of this study need to be acknowledged. Although the sample was large, participants were observed for short periods of time playing with a particular type of material. Future studies should observe children during longer periods and in a diversity of play contexts. Additionally, due to a procedural error, the total blocks available varied by cultural context. Although number of blocks was controlled in the analysis, this difference may have affected participant behaviour in ways we did not capture and should be avoided in future studies. Relatedly, Canadian children's cultural backgrounds were more heterogeneous than those of Tzotzil Maya children. Given the size and distribution of our current sample, we were unable to consider whether sociodemographic variability *within* a cultural context was associated with prosociality; however, this is an exciting avenue for future research, particularly in the context of

settler and Indigenous groups in Canada. Another important consideration is that Maya children were observed at school which has been used as a colonization tool against this community. Moreover, the children were unfamiliar with the research assistants, which might have influenced their behaviors. Future studies should observe Maya children in a more neutral context such as a community center. Indeed, a systematic examination of Maya children's prosociality in the sibling versus peer context would help contextualize the current findings. Additionally, the overall percentage of agreement for the identification of needs between the coders was only moderate, underlining the subjectivity inherent in identifying more subtle expressions of needs. Finally, inasmuch as our study relied on observations of children's behavior, asking children about their perspectives on prosocial responsiveness and to narrate their prosocial experiences may provide complementary information about how children interpret others' needs and their own roles in addressing them.

Conclusions

The results of this study contribute to our understanding of prosocial development. By employing a semi-naturalistic design across two distinct cultural milieus, we found that spontaneous prosociality is a common way children act on behalf of peers that warrants further exploration. Our findings align with Köster and Kärtner's (2019) model of intertwined developmental processes of prosociality by showing that children explore, understand, and navigate through different prosocial opportunities (i.e., social cognition level) while interacting with peers (i.e., social interaction level) and carve out culture-appropriate prosocial skills (i.e., cultural learning level). More research is required to determine whether and how prosocial behaviors are supported by similar or different motivations across cultures. Future studies should extend this line of research by integrating naturalistic observations with ethnography and

narrative studies to examine the links between children's development of prosociality and broader societal factors such as peer culture, parental socialization practices, and social norms.

References

Alcalá, L., Cervera Montejano M. D., & Fernandez, Y.S. (2021). How Yucatec Maya children learn to help at home. *Human Development*, (65), 191–203. https://doi.org/10.1159/000518457

Alcalá, L., Rogoff, B., & López Fraire, A. (2018). Sophisticated collaboration is common among Mexican-heritage US children. *Proceedings of the National Academy of Sciences of the United States of America, 115*(45), 11377–11384. https://doi.org/10.1073/pnas. 1805707115

Alcalá, L., Rogoff, B., Mejía-Arauz, R., Coppens, A. D., & Dexter, A. L. (2014). Children's initiative in contributions to family work in indigenous-heritage and cosmopolitan communities in Mexico. *Human Development*, *57*, 96–115. https://doi-org/10.1159/000356763

Aime, H., Broesch, T., Aknin, L.B., & Warneken, F. (2017). Evidence for proactive and reactive helping in two- to five-year-olds from a small-scale society. *PLoS ONE*, 12(11), e0187787. https://doi.org/10.1371/journal.pone.0187787

Blake, P. R., McAuliffe, K., Corbit, J., Callaghan, T. C., Barry, O., Bowie, A., Kleutsch, L, Kramer, K. L., Ross, E., Vongsachang, H., Wrangham, R., & Warneken, F. (2015). The ontogeny of fairness in seven societies. *Nature*, *528*(7581), 258–261. https://doi-org/10.1038/nature15703

Callaghan, T., & Corbit, J. (2018). Early prosocial development across cultures. *Current Opinion in Psychology*, *20*, 102–106. https://doi.org/10.1016/j.copsyc.2017.07.039

callaghan, T., Moll, H., Rakoczy, H., Warneken, F., Liszkowski, U., Behne, T., & Tomasello, M. (2011). Early social cognition in three cultural contexts. *Monographs of the Society for Research in Child Development, 76*(2), 1–142. https://doi-org /10.1111/j.1540-5834.2011.00603.x

Carpendale, J. I., & Lewis, C. (2015). The development of social understanding. In R. M. Lerner & W. F. Overton (Eds.), *The handbook of life-span development: Vol. 2. Cognitive processes* (pp. 548–627). Wiley. https://doi.org/10.1002/9781118963418.childpsy210

Cole, P. M., & Tamang, B. L. (1998). Nepali children's ideas about emotional displays in hypothetical challenges. *Developmental Psychology*, *34*(4), 640–646. https://doi-org/10.1037/0012-1649.34.4.640

Coppens, A. D., Alcalá, L., Mejía-Arauz, R., & Rogoff, B. (2014). Children's initiative in family household work in Mexico. *Human Development*, *57*, 116-130. https://doi.org/10.1159/000356768

Coppens, A. D., & Rogoff, B. (2021). Cultural variation in the early development of initiative in children's prosocial helping. *Social Development*. https://doi.org/10.1111/sode.12566

Corbit, J., Callaghan, T., & Svetlova, M. (2020). Toddlers' costly helping in three societies. *Journal of Experimental Child Psychology*, *195*, e10841. https://doi.org/10.1016/j.jecp.2020.104841

Corsaro, W. A. (2009). Peer culture. In J. Qvortrup, W. A. Corsaro, & M-S, Honig (Eds.), *The Palgrave handbook of childhood studies* (pp. 301–315). Palgrave Macmillan.

Dahl, A. (2017). Ecological commitments: Why developmental science needs naturalistic methods. Child Development Perspectives, 11, 79–84. https://doi.org/10.1111/cdep.12217

Dahl, A. (2018a). New beginnings: An interactionist and constructivist approach to early moral development. *Human Development, 61*, 232–247. https://doi-org/10.1159/000492801

Dahl, A. (2018b). How, not whether: Contributions of others in the development of infant helping. *Current Opinion in Psychology*, *20*, 72–76. https://doi-org/10.1016/j.copsyc.2017.07.038

de León, L. (2015). Mayan children's creation of learning ecologies by initiative and cooperative action. *Advances in Child Development and Behavior*, 49,153–84. https://doi.org/10.1016/bs.acdb.2015.10.006

Dunfield, K. (2014). A construct divided: Prosocial behavior as helping, sharing, and comforting subtypes. *Frontiers in Psychology*, 5, 1–13. https://doi.org/10.3389/fpsyg.2014.00958

Dunfield, K., & Kleis, A. (2018). Helping, sharing, and comforting in a cross-cultural context. Paper presented at the Development 2018 conference, Saint-Catherines, Canada.

Dunfield, K., Kuhlmeier, V. A., O'Connell, L., & Kelley, E. (2011). Examining the diversity of prosocial behavior: Helping, sharing, and comforting in infancy. *Infancy, 16*(3), 227–247. https://doi-org/10.1111/j.1532-7078.2010.00041.x

Eisenberg, N., Spinard, T. L., & Knafo-Noam, A. (2015). Prosocial development. In M. E. Lamb, C. Garcia-Coll, & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Vol. 3. Socioemotional processes* (pp. 610–656). Wiley.

Fabes. R. A., Hanish, L. D., Martin, C. L., Moss, A., & Reesing, A. (2012). The effects of young children's affiliations with prosocial peers on subsequent emotionality in peer interactions. *British Journal of Developmental Psychology*, *30*, 569–585. https://doi.org/10.1111/j.2044-835X.2011.02073.x

Gaskins, S. (2020). Integrating cultural values through everyday experiences: Yucatec Maya Children's moral development. In L. A. Jensen (Ed.), *The Oxford handbook of moral development: An interdisciplinary perspective,* (pp. 186–203). Oxford University Press.

Gaskins, S. (2006a). The cultural organization of Yucatec Mayan children's social interactions. In X. Chen, D. C. French, & B. H. Schneider (Eds.), *Peer relationships in cultural context* (pp. 283–309). Cambridge University Press.

Gaskins, S. (2006b). Cultural perspectives on infant-caregiver interaction. In S.C. Levinson & N.J. Enfield (Eds.), *Roots of human sociality: Culture, cognition, and interaction* (pp. 279–298). Routledge.

Gaskins, S., & Miller, P. J. (2009). The cultural roles of emotions in pretend play. In C. D. Clark (Ed.), *Transactions at play* (pp. 5–21). University Press of America.

Hammond, S. I., & Brownell, C. A. (2018). Happily unhelpful: Infants' everyday helping and its connections to early prosocial development. *Frontiers in Psychology*, *9*, 1770. https://doi.org/10.3389/fpsyg.2018.01770

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*(2–3), 61–83. https://doi.org/10.1017/S0140525X0999152X

House, B. R., Silk, J. B., Henrich, J., Barrett, H. C., Scelza, B. A., Boyette, A. H., Hewlett, B. S., McElreath, R., & Laurence, S. (2013). Ontogeny of prosocial behavior across diverse societies. *Proceedings of the National Academy of Sciences*, *110*(36), 14586–14591. https://doi-org/10.1073/pnas.1221217110

Hox, J. J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications*. Routledge.

Kärtner, J., Keller, H., & Chaudhary, N. (2010). Cognitive and social influences on early prosocial behavior in two sociocultural contexts. *Developmental Psychology, 46*(4), 905–914. https://doi.org/10.1037/a0019718

Keller, H. (2012). Autonomy and relatedness revisited: Cultural manifestations of universal human needs. *Child Development Perspectives*, *6*(1), 12–18. https://doi-org/10.1111/j.1750-8606.2011.00208.x

Knafo, A., & Plomin, R. (2006). Prosocial behavior from early to middle childhood: Genetic and environmental influences on stability and change. *Developmental Psychology*, *42*(5), 771–786. https://doi-org /10.1037/0012-1649.42.5.771

Köster, M., & Kärtner, J. (2019). Why do infants help? A simple action reveals a complex phenomenon. *Developmental Review*, *51*, 175–187. https://doi-org/10.1016/j.dr.2018.11.004

Kramer, K. L. (2005). Children's help and the pace of reproduction: Cooperative breeding in humans. *Evolutionary Anthropology, 14*(6), 224–237. https://doi-org/10.1002/evan.20082

Lancy, D. F. (2018). *Anthropological perspectives on children as helpers, workers, artisans, and laborers*. Palgrave Macmillan.

López, A., Ruvalcaba, O., & Rogoff, B. (2015). Attentive helping as a cultural practice of Mexican-heritage families. In Caldera, Y. M., & Lindsey, E. W. (Eds.) *Mexican American children and families: Multidisciplinary perspectives*. Routledge.

Martínez-Pérez, M. (2015). Adults' orientation of children - and children's initiative to pitch in – to everyday adult activities in a Tsotsil Maya community. *Advances in Child Development and Behavior, 49*, 113–135. https://doi.org/10.1016/bs.acdb.2015.09.002

Maynard, A. E. (2002). Cultural teaching: The development of teaching skills in Maya sibling interactions. *Child Development*, *73*, 969–982. https://doi-org.lib-ezproxy.concordia.ca/10.1111/cdev.12542

Paulus, M. (2014). The emergence of prosocial behavior: Why do infants and toddlers help, comfort, and share? *Child Development Perspectives*, *8*(2), 77–81. https://doi.org/10.1111/cdep.12066

Philpot, R., Liebst, L. S., Levine, M., Bernasco, W., & Lindegaard, M. R. (2020). Would I be helped? Cross-national CCTV footage shows that intervention is the norm in public conflicts. *American Psychologist, 75*(1), 66–75. https://doi.org/10.1037/amp0000469

Rabe-Hesketh, S. & Skrondal, A. (2012). *Multilevel and longitudinal Modeling using Stata: Vol 2. Categorical responses, counts, and survival* (3rd ed.). Stata Press.

Rao, N., & Stewart, S. M. (1999). Cultural influences on sharer and recipient behavior: Sharing in Chinese and Indian preschool children. *Journal of Cross-Cultural Psychology*, *30*(2), 219–241. https://doi-org/10.1177/0022022199030002005

Rheingold, H. L. (1982). Little children's participation in the work of adults, a nascent prosocial behavior. *Child Development*, *53*(1), 114–125. https://doi.org/10.2307/1129643

Robbins, E., Starr, S., & Rochat, P. (2016). Fairness and distributive justice by 3-to 5-year-old Tibetan children. *Journal of Cross-Cultural Psychology*, *47*(3), 333–340. https://doi-org/10.1177/0022022115620487

Rochat, P., Dias, M. D., Liping, G., Broesch, T., Passos-Ferreira, C., Winning, A., & Berg, B. (2009). Fairness in distributive justice by 3-and 5-year-olds across seven cultures. *Journal of Cross-Cultural Psychology*, *40*(3), 416–442. https://doi-org/10.1177/0022022109332844

Rogoff, B. (2003). *The cultural nature of human development*. Oxford University Press.

Rogoff, B., Dahl, A., & Callanan, M. (2018). The importance of understanding children's lived experience. *Developmental Review*, *50A*, 5–15. https://doi.org/10.1016/j.dr.2018.05.006

Rubin, K. H., Coplan, R., Chen, X., Buskirk, A. A., & Wojslawowicz, J. C. (2005). Peer Relationships in Childhood. In M. H. Bornstein & M. E. Lamb (Eds.), *Developmental science: An advanced textbook* (5th ed., pp. 469–512).

Schäfer, M., Haun, D. B., & Tomasello, M. (2015). Fair is not fair everywhere. *Psychological Science*, *26*(8), 1252–1260. https://doi-org/10.1177/0956797615586188

Sierksma, J., Thijs, J., & Verkuyten, M. (2014). Children's intergroup helping: The role of empathy and peer group norms. *Journal of Experimental Child Psychology*, *126*, 369–83. https://doi-org/10.1016/j.jecp.2014.06.002

Sinha, M. (2014, October 30). *Childcare in Canada.* Statistics Canada. *https://www150.statcan.gc.ca/n1/pub/89-652-x/89-652-x2014005-eng.htm*

Statistics Canada (2017, October 25). *Census in brief ethnic and cultural origins of Canadians: Portrait of a rich heritage*. https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016016/98-200-x2016016-eng.cfm

Super, C. M., & Harkness, S. (1986). The developmental niche: A conceptualization at the interface of child and culture. *International Journal of Behavioral Development, 9*(4), 545–569. https://doi.org/10.1177/016502548600900409

Tavassoli, N., Howe, N., & DeHart, G. (2020). Investigating the development of prosociality through the lens of refusals: Children's prosocial refusals with siblings and friends. *Merrill-Palmer Quarterly*, 66(4), 421–446, https://doi.org/10.13110/merrpalmquar1982.66.4.0421

Tavassoli, N., Recchia, H., & Ross, H. (2019). Preschool children's prosocial responsiveness to their siblings' needs in naturalistic interactions: A longitudinal study. *Early Education & Development,* 30(6), 724–742. https://doi.org/10.1080/10409289.2019.1599095

Trommsdorff, G., Friedlmeier, W., & Mayer, B. (2007). Sympathy, distress, and prosocial behavior of preschool children in four cultures. *International Journal of Behavioral Development*, *31*(3), 284–293. https://doi-org/10.1177/0165025407076441

Warneken, F. (2013). Young children proactively remedy unnoticed accidents. *Cognition, 126*(1), 101–108. https://doi.org/10.1016/j.cognition.2012.09.011

Warneken, F., & Tomasello, M. (2006). Altruistic helping in human infants and young chimpanzees. *Science, 311*(5765), 1301−1303. https://doi-org/10.1126/science.1121448

Whiting, B. B., & Whiting, J. W. (1975). *Children of six cultures: A psycho-cultural analysis.* Harvard University Press.

Table 1

Parameter Estimates Predicting Children's Expressions of Needs

	Unconditional Model	Model 1 (*Emotional* reference)	Model 2 (*Instrumental* reference)	Model 3 (*Material* reference)
Fixed effects				
Intercept	2.039 (.108)***	1.905 (.246) ***	4.294 (.246)***	1.306 (.246)***
Emotional need		Reference	-2.388 (.313)***	.599 (.313)*
Instrumental need		2.388 (.313)***	Reference	2.988 (.313)***
Material need		-.599 (.313)*	-2.988 (.313)***	Reference
Gender		-.447 (.253)	-.897 (.253)***	.021 (.253)
Emotional need		Reference	.450 (.351)	-.468 (.351)
Instrumental need		-.450 (.351)	Reference	-.918 (.351)**
Material need		.468 (.351)	.918 (.351)**	Reference
Cultural Context		-1.007 (.287)**	-.285 (.287)	-.090 (.287)
Emotional need		Reference	-.722 (.352)**	-.916 (.352)**
Instrumental need		.722 (.352)**	Reference	-.194 (.352)
Material need		.916 (.352)**	.194 (.352)	Reference
Variance/residual variance components				
Level 1 σ^2	.307 (.132)	.327 (.116)		.
Level 2 σ^2	6.314 (.305)	4.717 (.228)		
ICC	.050	.064		
Model Fit Statistics				
LL	-2165.302	-2036.313		
AIC	4336.604	4094.627		

Note. Gender (female = 1); Cultural Context (Tzotzil Maya = 1); ICC = Intraclass correlation; LL = Log likelihood; AIC = Akaike's information criterion; *p = .05, **p < .05, ***p < .001

Table 2

Parameter Estimates Predicting Children's Responses to Prosocial Opportunities

	Unconditional Model	Model 1 (*Denial* reference)	Model 2 (*No response* reference)	Model 3 (*Prosocial* reference)
Fixed effects				
Intercept	3.017 (.173)***	4.844 (1.128)***	9.160 (1.128)***	2.877 (1.128)**
Denial		Reference	-4.316 (1.328)***	1.966 (1.328)
No response		4.316 (1.328)***	Reference	6.283 (1.328)***
Prosocial		-1.966 (1.328)	-6.283 (1.328)***	Reference
Number of Blocks per child		-.060 (.033)	-.126 (.033)***	.022 (.033)
Denial		Reference	.065 (.039)	-.082 (.039)**
No response		-.065 (.039)	Reference	-.148 (.039)***
Prosocial		.082 (.039)**	.148 (.039)***	Reference
Cultural Context		-1.526 (.578)**	-3.136 (.578)***	-1.718 (.578)**
Denial		Reference	1.610 (.672)**	.192 (.672)
No response		-1.610 (.672)**	Reference	-1.418 (.672)**
Prosocial		-.192 (.672)	1.418 (.672)**	Reference
Variance/residual variance components				
Level 1 σ^2	1.261 (.334)	.725 (.231)		
Level 2 σ^2	9.379 (.453)	8.477 (.409)		
ICC	.118	.078		
Model Fit Statistics				
LL	-2364.188	-2309.084		
AIC	4734.377	4640.16		

Note. Cultural context (Tzotzil Maya = 1); ICC = Intraclass correlation; LL = log likelihood; AIC = Akaike's information criterion; *p = .05, **p < .05, ***p < .001.

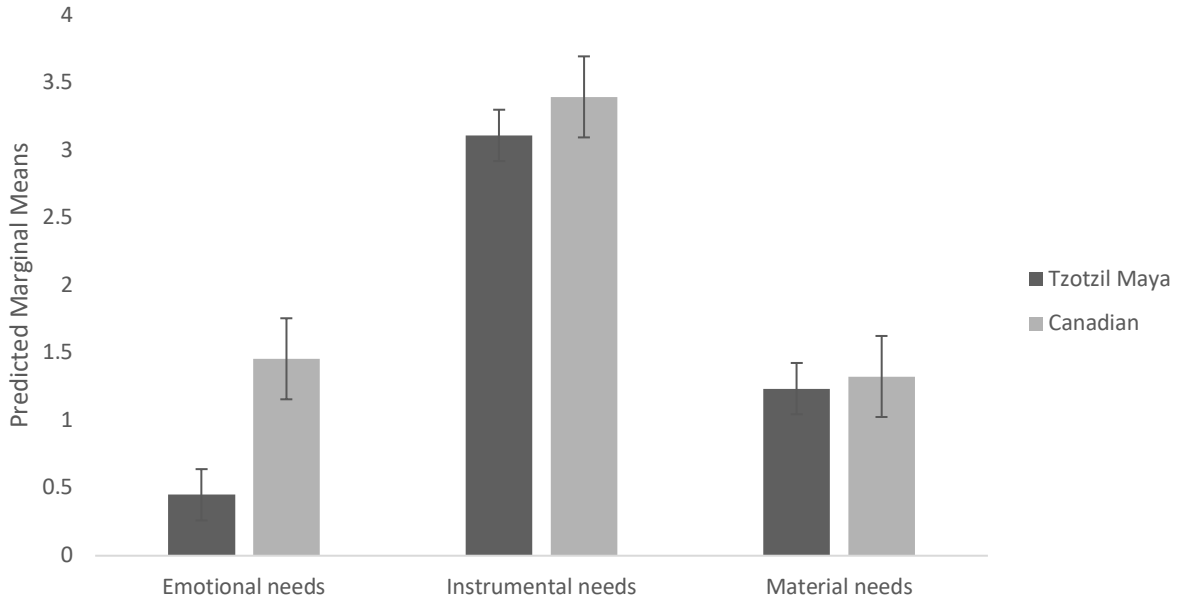


Figure 1. Predicted Marginal Means of Children's Expressions of Different Types of Needs in Two Cultural Contexts (controlling for gender)

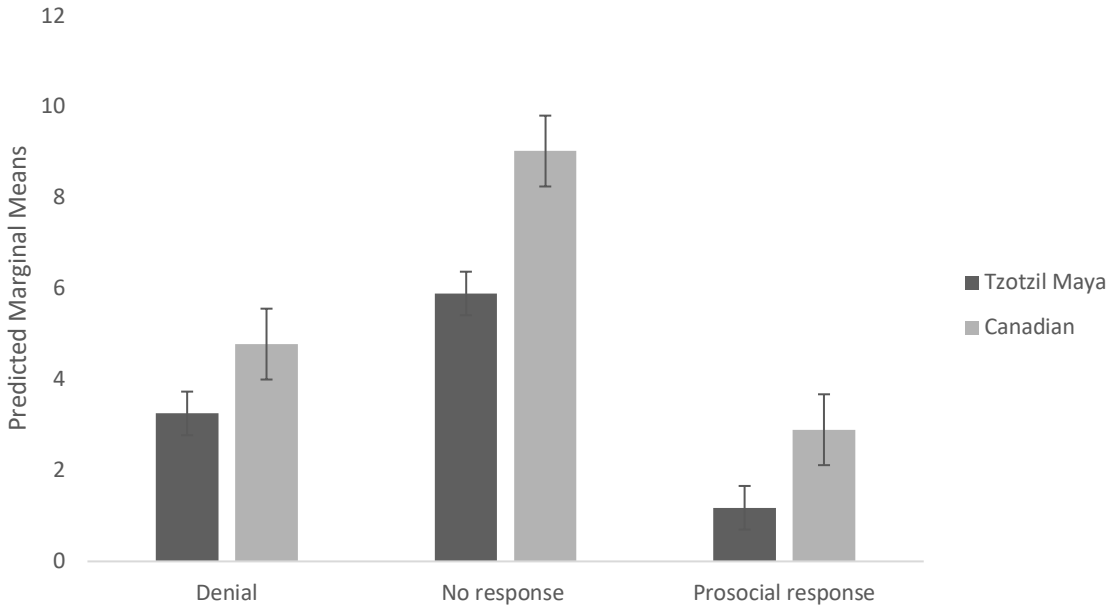
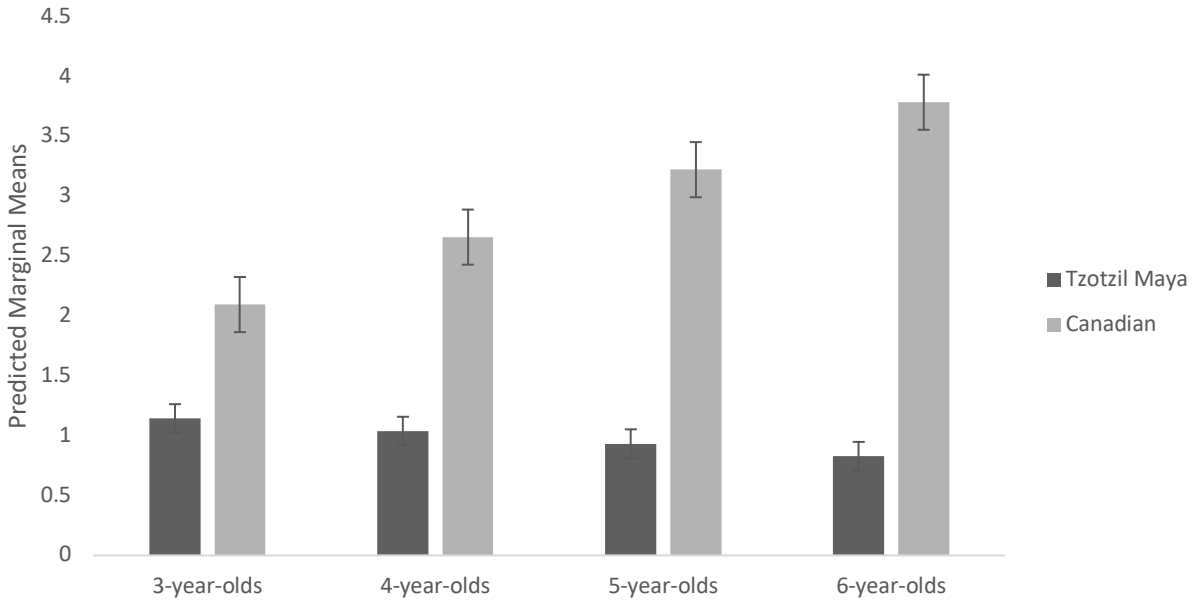


Figure 2. Predicted Marginal Means of Children's Responses to Prosocial Opportunities in Two Cultural Contexts (controlling for number of blocks)

(a)


4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Predicted Marginal Means
3-year-olds
4-year-olds
5-year-olds
6-year-olds
Tzotzil Maya
Canadian

(b)

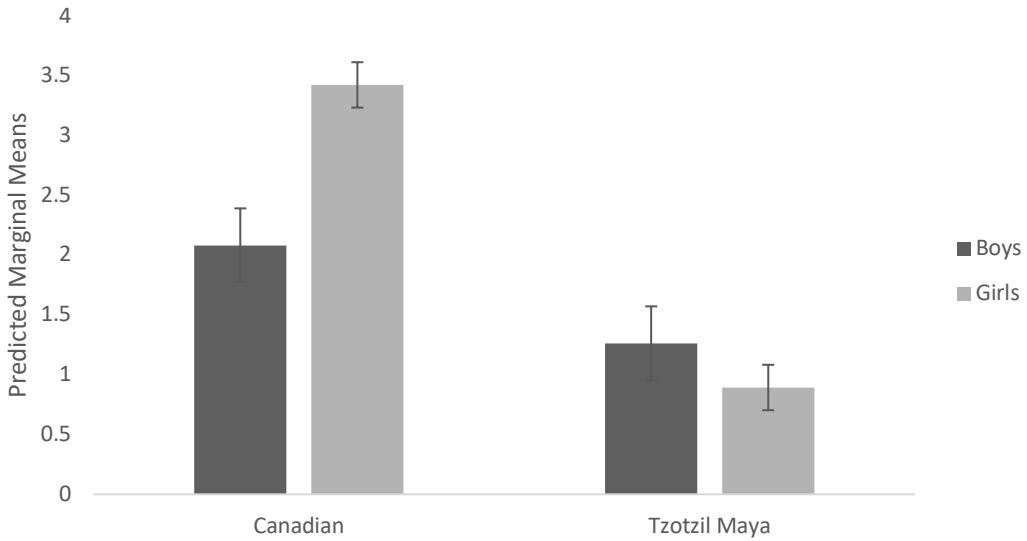


Figure 3. Predicted marginal means of children's spontaneous prosociality as a function of cultural context and (a) age and (b) gender

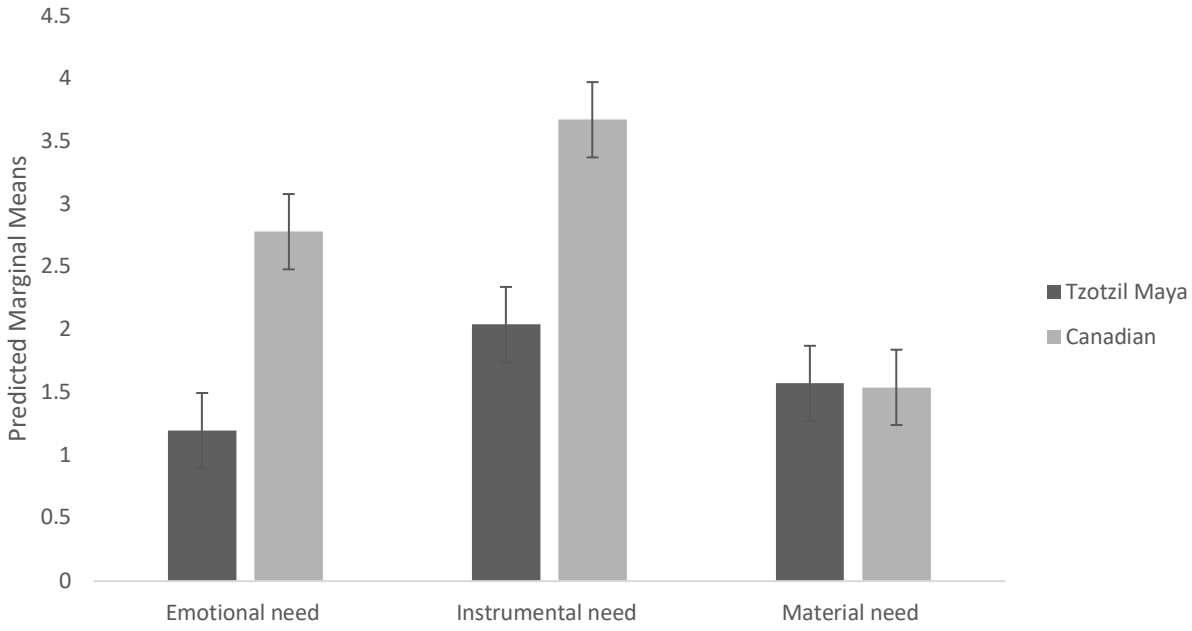


Figure 4. Predicted marginal means of children's denial of different needs in two cultural contexts (controlling for age and number of blocks)

Supplementary Materials

Table S1

Descriptive Statistics for Different Types of Needs and Responses

	Sum	Mean (SD)	Range
Needs			
Instrumental need	1136	3.71 (3.22)	0 – 17
Material need	390	1.27 (1.57)	0 – 9
Emotional need	351	1.15 (1.68)	0 – 11
Responses			
Prosocial response	769	2.51 (3.59)	0 – 24
Denial response	750	2.45 (2.81)	0 – 15
No response	1283	4.19 (3.06)	0 – 15
Spontaneous prosociality	618	2.02 (3.07)	0 – 19

Note. The frequency of responses was more than needs because all children in the group could respond to each need.

Table S2

Parameter Estimates Predicting Children's Prosocial Responses to Peers' Needs

	Unconditional Model	Model (*Emotional* ref)	Model (*Instrumental* ref)	Model (*Material* ref)	Model (*No apparent need* ref)
Fixed effects					
Intercept	.533 (.051)***	.338 (.164)	.220 (.164)	.331 (.164)	1.520 (.164)***
Emotional need		Reference	.118 (.226)	.007 (.226)	-1.181 (.226)***
Instrumental need		-.118 (.226)	Reference	-.111 (.226)	-1.129 (.226)***
Material need		-.007 (.226)	.111 (.226)	Reference	-1.189 (.226)***
No apparent need		1.181 (.226)***	1.129 (.226)***	1.188 (.226)***	Reference
Age		.139 (.122)	.052 (.122)	.121 (.122)	.563 (.122)***
Emotional need		Reference	.086 (.169)	.018 (.169)	-.424 (.169)**
Instrumental need		-.086 (.169)	Reference	-.068 (.169)	-.510 (.169)**
Material need		-.018 (.169)	.068 (.169)	Reference	-.442 (.169)**
No apparent need		.424 (.169)**	.510 (.169)**	.442 (.169)**	Reference
Gender		.058 (.221)	.154 (.221)	.234 (.221)	1.343 (.221)***
Emotional need		Reference	-.095 (.309)	-175 (.309)	-1.284 (.309)***
Instrumental need		.095 (.309)	Reference	-.080 (.309)	-1.189 (.309)***
Material need		.175 (.309)	.080 (.309)	Reference	-1.109 (.309)***
No apparent need		1.284 (.309)***	1.189 (.309)***	1.109 (.309)***	Reference
Cultural Context		-.298 (.219)	-.101 (.219)	-.238 (.219)	-.152 (.219)
Emotional need		Reference	-.196 (.303)	-.060 (.303)	-.145 (.303)
Instrumental need		.196 (.303)	Reference	.136 (.303)	-.051 (.303)
Material need		.060 (.303)	-.136 (.303)	Reference	-.085 (.303)
No apparent need		.145 (.303)	.051 (.303)	.085 (.303)	Reference

Age x Cultural Context		-.148 (.171)	.012 (.171)	-.153 (.171)	-.668 (.171)***
Emotional need		Reference	-.160 (.237)	.005 (.237)	.520 (.237)**
Instrumental need		.160 (.237)	Reference	.166 (.237)	.681 (.237)**
Material need		-.005 (.237)	-.166 (.237)	Reference	.515 (.237)**
No apparent need		-.520 (.237)**	-.681 (.237)**	-.515 (.237)**	Reference
Gender x Cultural Context		-.060 (.298)	-.159 (.298)	-.141 (.298)	-1.712 (.298)***
Emotional need		Reference	.099 (.419)	.080 (.419)	1.652 (.419)***
Instrumental need		-.099 (.419)	Reference	-.018 (.419)	1.552 (.419)***
Material need		-.080 (.419)	.018 (.419)	Reference	1.571 (.419)***
No apparent need		-1.652 (.419)***	-1.552 (.419)***	-1.571 (.419)***	Reference
Variance/residual variance components					
Level 1 σ^2	.057 (.030)	.026 (.021)			
Level 2 σ^2	2.100 (.087)	1.667 (.069)			
ICC	.026	.016			
Model Fit Statistics					
LL	-2204.364	-2058.006			
AIC	4414.377	4168.011			

Note. Age is centered around mean. Gender (female = 1); Cultural Context (Tzotzil Maya = 1); No apparent needs refer to spontaneous prosociality. ICC = Intraclass correlation; LL = Log likelihood; AIC = Akaike's information criterion; $^{*}p = .05$, $^{**}p < .05$, $^{***}p < .001$.

Table S3

Parameter Estimates Predicting Children's Denial Responses to Peer's Expressions of Needs

	Unconditional Model	Model (*Emotional* reference)	Model (*Instrumental* reference)	Model (*Material* reference)
Fixed effects				
Intercept	.985 (.081)***	2.548 (.574)***	3.312 (.574)***	1.462 (.574)**
Emotional need		Reference	-.764 (.693)	1.086 (.693)
Instrumental need		.764 (.693)	Reference	1.850 (.693)**
Material need		-1.086 (.693)	-1.850 (.693)**	Reference
Number of blocks per child		-.037 (.016)**	-.047 (.016)**	-.015 (.016)
Emotional need		Reference	.009 (.020)	-.022 (.020)
Instrumental need		-.009 (.020)	Reference	-.031 (.020)
Material need		.022 (.020)	.031 (.020)	Reference
Age		.273 (.107)**	.411 (.107)***	.097 (.106)
Emotional need		Reference	-.138 (.139)	.175 (.139)
Instrumental need		.138 (.139)	Reference	.314 (.139)**
Material need		-.175 (.139)	-.314 (.139)**	Reference
Cultural Context		-1.585 (.304)***	-1.632 (.304)***	.031 (.304)
Emotional need		Reference	.047 (.366)	-1.615 (.366)***
Instrumental need		-.047 (.366)	Reference	-1.663 (.366)***
Material need		1.615 (.366)***	1.663 (.366)***	Reference
Variance/residual variance components				
Level 1 σ^2	.247 (.073)	.166 (.059)		
Level 2 σ^2	2.474 (.119)	2.298 (.111)		
ICC	.090	.067		
Model Fit Statistics				
LL	-1746.737	-1707.148		
AIC	3499.475	3442.296		

Note. Age is centered around mean. Cultural context (Tzotzil Maya = 1); ICC = Intraclass correlation; LL = log likelihood; AIC = Akaike's information criterion; *p = .05, **p < .05, ***p < .001.

Children's Responsiveness to Different Manifestations of Needs

Analysis at the Level of Peer Groups

In order to understand the extent to which various needs were ultimately addressed or denied by the peer group as a whole, we examined the proportion of needs in each group that were addressed or denied by *at least one* of the children in that group. The nature of the task was such that multiple children could observe and respond to a single need, and as long as at least one child responded, the need could be alleviated. As such, this analysis allowed us to consider whether the apparently high rates of failing to respond (in both rural Tzotzil Maya and urban Canadian cultural contexts) might not fully portray the extent to which needs were actually being met (see Philpot et al., 2020, for a similar point).

In the following analysis, peer groups, rather than individual children within groups, are considered as the unit of analysis (N groups = 64). Rates of prosocial behaviors and denials in response to needs were calculated for each type of needs (e.g., frequency of prosocial behavior [or denial] in response to emotional needs in group 1/ frequency of emotional needs expressed in group 1). Overall, only 8.7% of needs were addressed prosocially, whereas 40% of needs were denied by at least one of the children in the group.

We conducted a series of repeated measures ANOVAs with type of need (i.e., instrumental, material, and emotional) as a within-subjects factor and cultural context as a between-subjects factor. Since emotional needs were never expressed in some groups, these groups were excluded from analysis, resulting in 27 groups in urban Canada and 24 groups in rural Tzotzil Mexico. A significant multivariate effect of need (Wilks' $\lambda = .75$, $p = .001$), and a significant interaction between need and cultural context, (Wilks' $\lambda = .81$, $p = .006$) were found. Pairwise comparison of proportion of needs addressed revealed that instrumental needs ($M = .049$, $SE = .01$) were addressed less often than emotional ($M = .106$, $SE = .02$) or material ($M = .181$, $SE = .03$) needs. The difference between addressing emotional and material needs was not significant ($p = .07$). Moreover, urban Canadian peer groups addressed both emotional needs and material needs more than Tzotzil Maya peer groups, however, both urban Canadian and Tzotzil Maya peer groups addressed instrumental needs to the same extent (Figure 1).

A similar series of repeated measures ANOVAs were conducted on denying behavior, with type of needs (instrumental, material, and emotional) as a within-subjects factor and cultural context as a between-subjects factor. A significant multivariate effect of need, (Wilks' $\lambda = .29$, $p < .001$), and a significant interaction between need and cultural context (Wilks' $\lambda = 74$, $p = .001$) were found. Pairwise comparisons revealed that proportionally material needs ($M = .74$, $SE = .04$) were denied more than emotional needs ($M = .46$, $SE = .05$), followed by instrumental needs ($M = .28$, $SE = .02$). Moreover, Tzotzil Maya peer groups denied material needs more than urban Canadian peer groups. However, the proportion of emotional needs and instrumental needs that were denied did not differ between rural Mexico and urban Canada (Figure 1).

Lastly, to compare prosociality and denial rates across cultural contexts, a 2 response (prosocial, denial) by 3 types of needs (emotional, instrumental, material) repeated measures ANOVA with cultural context as a between-subjects factor was conducted. To avoid repeating findings reported in previous paragraphs, only the significant 3-way interaction between response, need type and cultural context (Wilks' $\lambda = 75$, $p = .001$) is described here. Pairwise comparisons indicated that Tzotzil Maya peer groups denied material needs more than urban Canadian peer groups, whereas these urban Canadian peer groups addressed material needs more than Tzotzil Maya peer groups. Emotional needs were denied to the same extent in both rural Mexico and urban Canada, but urban Canadian peer groups addressed emotional needs more than their Tzotzil Maya counterparts (Figure 1).

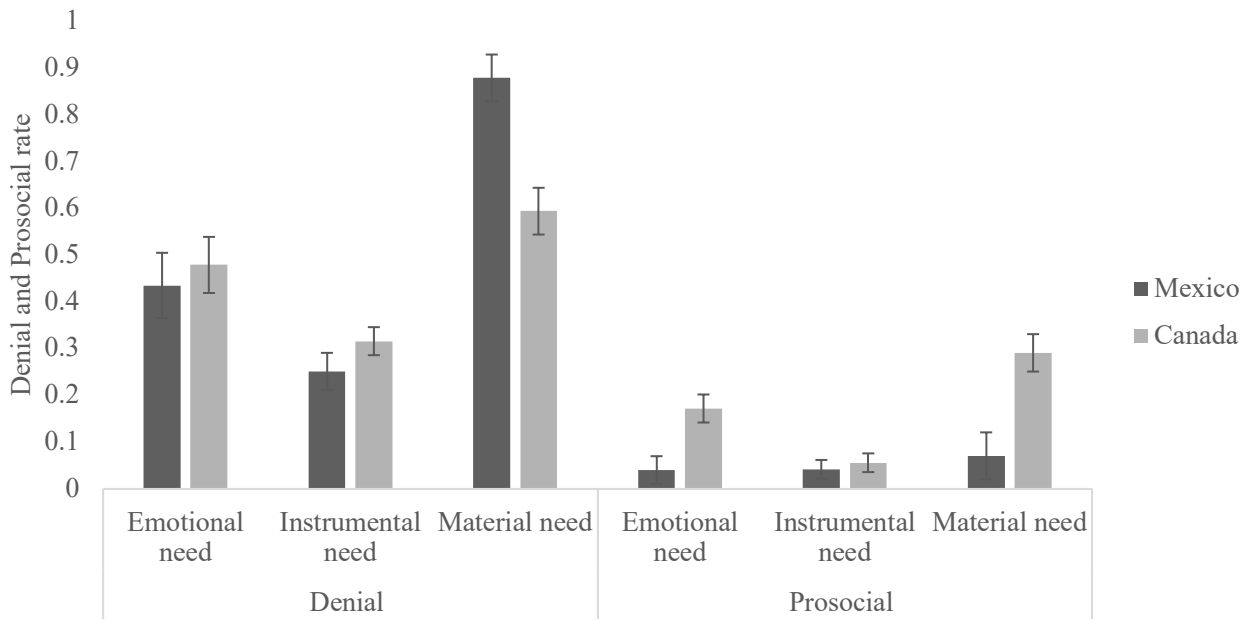


Figure S1. Denial and prosocial rates of different types of needs across rural Mexico and urban Canada (group level analysis)

Types of Prosocial Behaviors

The unconditional model revealed that 3% of the variability in children's engagement in prosocial behaviors lies between peer groups. The best model fit indicated that cultural context (b = -.39, p <.001) significantly predicted children's engagement in different prosocial behaviors. Further analysis on types of prosocial behaviors indicated that children engaged in helping more than sharing, followed by comforting. Moreover, urban Canadian children engaged in instrumental helping more than Tzotzil Maya children, however comforting and sharing were not significantly different across cultural contexts.

Table S4

Parameter Estimates Predicting Children's Engagement in Different Types of Prosocial Behavior

	Unconditional Model	Model 1 *(Comforting* reference)	Model 2 (*Helping* reference)	Model 3 (*Sharing* reference)
Fixed effects				
Intercept	.595 (.056)***	.156 (.120)	1.473 (.120)***	.804 (.120)***
Comforting		Reference	-1.316 (.163)***	-.647 (.163)***
Helping		1.316 (.163)***	Reference	.669 (.163)***
Sharing		.647 (.163)***	-.669 (.163)***	Reference
Cultural Context		-.156 (.163)	-.730 (.163)***	-.306 (.163)
Comforting		Reference	.574 (.221)**	.150 (.221)
Helping		-.574 (.221)**	Reference	-.423 (.221)*
Sharing		-.150 (.221)	.423 (.221)*	Reference
Variance/residual variance components				
Level 1 σ^2	.059 (.037)	.035 (.030)		
Level 2 σ^2	2.056 (.099)	1.858 (.089)		
ICC	.027	.018		
Model Fit Statistics				
LL	-1644.587	-1594.74		
AIC	3295.176	3205.492		

Note. Cultural Context (Tzotzil Maya = 1); ICC = Intraclass correlation; LL = Log likelihood; AIC = Akaike's information criterion; *p = .05, **p < .05, ***p < .001

Sample of Coding Manual

CODING CRITERIA

Need

Code		Example of behaviours
NEED		Demonstrating • Observable occurrences (e.g., blocks fall down) • Nonverbal cues (e.g., pointing or reaching, being sad, or any signs of crying or frowning) • Verbal statements or requests ("I need…"; "Where is…?")
	TYPE	• **Instrumental need**: having difficulty completing a goal directed behavior (e.g., tower breaking down) • **Material need**: not having/not being able to acquire a desired resource (e.g., someone needs more blocks: "give it to me", "Can I have some?") • **Emotional need**: experiencing a negative emotional state (e.g., crying, yelling) ****NOTE: Codes are not mutually exclusive.**

Response to a need

Prosocial behavior (PSB)	TYPE	When the child addresses another child's need.
	HELP	- Picking up blocks that fell down for another child - Helping another child to re-build a tower after it crashed - Helping another child to stand up - Prosocial teaching: "This is how you do it" NOTE: Instances of cooperation are not coded as prosociality. This includes working together to achieve a shared goal (e.g., build a tower together), turn-taking, and joint activity.
	SHARE	- Giving up some of own blocks to another child
	COMFORT	- Verbal reassurance (e.g., "it's ok", "are you ok?", "is something wrong", "Don't cry!", "Sorry!") - Physical reassurance (hug, pat, kiss) - Social aid (seeks teacher or another child)

PSB SPONTANEOUS	When a PSB occurs spontaneously without an apparent preceding need. Coded together with type of PSB (Helping, sharing, comforting)
NO RESP	The child notices a need but does not address it (e.g., direct line of sight but no reaction)
DENIAL / REJECTION	The child rejects an opportunity to be prosocial by: • Disagreeing, saying "no", shaking head • Moving *physically* away (creating distance) or resisting to give an object • Providing reasoned argumentation ("you can't have the green one because you are supposed to use only the blue ones") • Laughing and teasing when another child is in distress
UNAWARE	The child does not notice that another child is experiencing a negative state/need (e.g., child has no direct line of sight of the event).