



Perceptions of Parental Privacy Invasion and Information Management among Chinese Adolescents: Comparing Between- and Within-Family Associations

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Abstract

The traditional Chinese conceptualization of family privacy is interdependent and hierarchically structured, but mounting evidence suggests that contemporary Chinese youth hold strong desires for individual privacy and respond defensively to perceived parental privacy invasions. The current research examined within-person associations among adolescents' perceptions of parental privacy invasion, secrecy, and disclosure to parents in the Chinese context. This study collected data from 289 Chinese youth ($M_{ageT1} = 13.57$, $SD = 0.63$, 50.30% male) at six-month intervals over one year. Random intercept cross-lagged panel modeling (RI-CLPM) showed that stronger perceptions of parental invasion predicted later within-person decreases in adolescents' disclosure and increases in secrecy. Disclosure and secrecy did not predict later perceptions of parental invasion at the within-person level. The findings suggest that Chinese youth manage privacy reactively and defensively when feelings of invasion occur, by decreasing disclosure and increasing secrecy. Stereotypes portraying Chinese youth as highly deferential to parents' demands for informational access might not be representative of adolescents in contemporary society.

Keywords Parental Invasion · Secrecy · Disclosure · Early Adolescents · RI-CLPM · Within-Family Associations

Introduction

Adolescents strive for greater control over their personal boundaries as they mature. Although parents claim a legitimate right to access children's information (Rote & Smetana, 2016), youth might disagree and attempt to take more ownership over private matters. Discrepant perceptions of information (co-)ownership with parents might threaten or violate privacy expectations (Hawk, 2017; Hawk et al., 2016; Tang & Dong, 2006). In this case, adolescents can

experience feelings of privacy invasion, or a loss of desired control over others' access to their personal spaces and information, which might provoke defensive behaviors to protect privacy (Petronio, 2010). One typical way of maintaining or re-establishing privacy control is information management (Ledbetter et al., 2010; Ledbetter & Vik, 2012), such as strategically disclose information or keep secrets, to determine how much and what kinds of knowledge their parents can access. However, there is a lack of clarity about family privacy management processes in cultures oriented more strongly toward interdependent relationships, and relatively little empirical attention to adolescents' multiple strategy use in regulating privacy in longitudinal research. Moreover, prior studies regarding family privacy dynamics have largely failed to distinguish stable between-family differences from within-family fluctuations. The current study addresses these limitations, examining longitudinal associations between Chinese adolescents' perceptions of parental privacy invasion, disclosure, and secrecy at the within-person level.

Communication Privacy Management theory (CPM; Petronio, 2002, 2010) proposes that individuals view

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themselves as owners of their personal information and thus create metaphorical privacy boundaries. Particularly in adolescence, individuals expand the scope (i.e., issues considered private) and reduce the permeability (i.e., accessibility) of these boundaries. Disclosure and secrecy are two techniques commonly utilized by family members to modify the scope and permeability of boundaries (Petronio, 2010). These two seemingly opposing strategies reflect the dialectical tensions inherent in privacy management processes, in which adolescents simultaneously juxtapose their dual needs for separation and connectedness within family relationships. Although disclosure has shown concurrent and longitudinal reciprocal associations with secrecy (e.g., Laird et al., 2013a), with lower disclosure predicting greater secrecy and vice-versa, youth can utilize these two strategies in conjunction. For example, youth might tell parents about their school day, but deliberately withhold important information about their peer interactions. Moreover, disclosure and secrecy are unique indicators of youth's psychosocial adjustment and family functioning (Frijns et al., 2010; Jäggi et al., 2016). For example, beyond merely engaging in minimal secrecy, adolescents' voluntary disclosure can promote relationship intimacy with parents, showing stronger links with parental acceptance and positive family relationship quality (Rote et al., 2020; Smetana et al., 2006). Conversely, compared to infrequent disclosure, secrecy holds stronger associations with adolescent adjustment difficulties (Finkenauer et al., 2002, 2005), negative family interactions (Smetana et al., 2006), and parental disengagement (Frijns et al., 2010). Considering the distinct, independent effects that disclosure and secrecy might have on youth's developmental outcomes, it is important to examine them simultaneously in studies of family privacy dynamics. The present research therefore examined within-person relations between disclosure and secrecy, and the unique associations they respectively hold with perceptions of parental invasion.

CPM theory further suggests that cultural norms influence privacy expectations, judgments, and management (Petronio, 2002). However, prior longitudinal studies on family privacy coordination have mainly focused on contexts that stress individualistic values (e.g., Dietvorst et al., 2018; Hawk et al., 2013; Son & Padilla-Walker, 2021), and understudied these processes within non-WEIRD (i.e., Western, Educated, Industrial, Rich, and Democratic; Henrich et al., 2010) families. Assuming these privacy dynamics are universal across families with various backgrounds can lead to misunderstandings in interpreting youth's information management (Frijns et al., 2020), which might in fact be substantially heterogeneous. The current study therefore focused on families from a less economically developed, culturally traditional region in China, in order to broaden understandings regarding youth privacy management in non-WEIRD families.

Privacy in Chinese Families

Traditional Chinese culture might influence youth's construction of privacy boundaries. Specifically, Chinese cultures emphasize family connectedness and children's obedience toward parents (Wang et al., 2020), which might determine how much information adolescents are expected to share or withhold with parents. Therefore, in contrast to youth from cultures highly oriented toward individualism (e.g., the United States), Chinese adolescents show a slower decline in parent-oriented self-construal (Pomerantz et al., 2009) and a more stable sense of responsibility towards parents (Pomerantz et al., 2011). Consistent with this cultural orientation toward interdependence, traditional Chinese conceptualizations of privacy are often based around the family unit, differentiating family members from extra-familial others (Chan, 2000), which contrasts with the individual-level privacy boundary construction that is more prevalent in highly independent cultures (e.g., Zabihzadeh et al., 2019). Therefore, privacy boundaries between Chinese family members can be more ambiguous or highly permeable, since both adolescents and parents might perceive greater co-ownership of informational and spatial boundaries. Moreover, privacy within Chinese families is vertically structured, in line with parents' greater levels of unilateral authority. Chinese parents often view themselves as entitled to adolescents' information (Chan, 2000), whereas parents in more independent cultures might be more willing to gradually relinquish this control both at earlier ages and to greater extents, and detach themselves from youth's personal lives (Kagitcibasi, 2013). Indeed, Chinese parents who view privacy as conceptually equivalent to concealment perceive greater authority to access children's private domains than those who endorse beliefs about individual privacy rights (Tang & Dong, 2006). Children, in turn, are morally obligated to share information with parents. Accordingly, compared to American youth, Chinese early adolescents disclose more to parents about their personal, peer, and academic issues (Cheung et al., 2013). Taken together, traditional Chinese conceptualizations of privacy might influence how youth perceive and respond to privacy turbulence. Chinese adolescents' socialization orientations and parent-youth asymmetry in expectations for informational ownership might also complicate youth's ability to protect themselves against perceived invasions.

Despite acknowledging parents' 'right to know' about certain domains of their lives, adolescents might still view themselves as the primary custodians of that knowledge and desire control over how (much) information is shared with parents (e.g., Chan et al., 2015; Rote & Smetana, 2016). Similar to studies conducted with American and Dutch adolescents (e.g., Hawk et al., 2016; Smetana et al., 2006),

Chinese adolescents (versus parents) express stronger disagreement with parents' legitimacy to access children's personal spaces (e.g., bedrooms, bathrooms), property (e.g., bags, e-mail, diaries), or information (e.g., activities with friends, online behaviors, spending habits, exam scores) without their permission (Hawk, 2017; Tang & Dong, 2006), or make unilateral decisions about youth's personal issues (Wang & Faldowski, 2014). Furthermore, Chinese adolescents' self-disclosures to parents decrease over time at similar rates to their American counterparts (Cheung et al., 2013), implying a similar process of decreasing information access across different cultures. These findings suggest that, when faced with feelings of intrusion or over-control, Chinese adolescents may become less willing to openly communicate information that they would otherwise view as important or even necessary to share with parents.

Chinese youth might distance themselves from parents in order to fulfill their needs for individual privacy, despite this behavior contradicting cultural expectations for children to unconditionally submit to parental demands. Aiming to understand this dialectical tension between Chinese adolescents' needs to stay connected and also establish their independence, this study examined privacy dynamics within families in Shandong Province, a culturally traditional region of China. As the birthplace of Confucius, celebration of and adherence to Confucian philosophy comprises a core aspect of cultural identity in Shandong; accordingly, individuals in this region report high levels of "Confucian traits", such as relational relatedness, traditionalism, and rule compliance (Obschonka et al., 2019). Even in this region, however, youth report expectations for autonomy and dissatisfaction with rigid forms of parental authority (e.g., Zhang & Fuligni, 2006), making Shandong a valuable context for exploring family privacy dynamics. Considering that Western research on family privacy processes has reported inconsistent findings regarding the direction and valence of particular effects, identifying relationships between these constructs in a variety of cultural contexts is theoretically informative.

Parent-Driven and Youth-Driven Privacy Processes

Earlier studies predominantly suggest the presence of parent-driven privacy management processes, wherein parental invasions prompt changes in adolescents' information management. For example, studies using cross-lagged panel modeling (CLPM) have found that Dutch adolescents' perceptions of parental invasion predicted greater concealment one year later (Hawk et al., 2013), and that American adolescents' reports of intrusive parental monitoring predicted greater secrecy and reduced internalization of parental values (Son & Padilla-Walker, 2021). Parental invasions might also provoke resistance among Chinese

adolescents, as one recent cross-sectional study showed that greater covert parental monitoring predicted more concealment and less disclosure, via youth's invasion perceptions (Hawk, 2017). Overly-controlling parental monitoring practices are also negatively correlated with Chinese adolescents' trust in parents and frequency of disclosure (Ying et al., 2015). Although these initial studies require longitudinal replication, their findings collectively indicate that perceived parental invasion might motivate Chinese adolescents to reinforce privacy boundaries by reducing their voluntary disclosure and/or keeping secrets.

It is also possible that adolescents' use of particular information management strategies predicts changes in their later reports of parental privacy invasion. Existing findings are inconsistent regarding these youth-driven processes, however. Some studies suggest that concealing information from parents might intensify future privacy turbulence, as parents who suspect or detect youth secrecy might respond with more intrusive behaviors. For instance, parental perceptions of child concealment were positively associated with more covert monitoring (Hawk et al., 2016, Study 2). Longitudinal research using CLPM analysis has also shown that Dutch adolescents' own reports of concealment predicted greater invasion perceptions one year later (Hawk et al., 2013), suggesting that unilateral efforts to assert desired privacy boundaries might backfire. Other studies suggest a protective role of secrecy, however; most notably, one recent study used random intercept cross-lagged panel modeling (RI-CLPM) to examine intra-individual associations between privacy invasion and secrecy over time among Dutch adolescents (Dietvorst et al., 2018), incorporating three waves of data with three-month intervals. This research found no evidence of parent-driven processes at the within-person level, but did find that youth's greater secrecy predicted later *decreases* in their invasion perceptions. Consistent with prior research suggesting that secrecy might facilitate adolescents' emotional autonomy (Finke-nauer et al., 2002), the authors suggested that youth secrecy might protect against future invasions, rather than merely being a reaction to perceived parental intrusion.

The absence of parent-driven processes and the negative association from secrecy to invasion in this previous study both represent departures from the majority of literature examining these topics, and offer a different interpretation of family privacy dynamics. One explanation for these deviations concerns the use of RI-CLPM to separate stable between-person differences from within-person fluctuations (Hamaker et al., 2015). Indeed, studies explicitly comparing CLPM with RI-CLPM suggest that the former can lead to biased conclusions regarding the direction, valence, or/and magnitude of effects (e.g., Dietvorst et al., 2018; Rote et al., 2020). In contrast, by adding latent intercept factors to CLPM, RI-CLPM can identify within-person associations

over time between youth perceptions of privacy invasion and their information management behaviors (e.g., does one typical adolescent who perceives more parental invasion than his/her own average level engage in more secrecy and less disclosure later on than is typical for that youth?). Additionally, these processes might differ based on the timeframe at which they are examined. While the study of Dietvorst et al. (2018) suggested potential short-term (i.e., three-month) protective effects of secrecy against invasion, most other longitudinal studies of these processes have utilized longer-term measurement intervals (i.e., six months or one year; see distinctions made by Boele et al., 2020). Therefore, more research is needed to explore within-family privacy dynamics at relatively longer intervals and/or timespans.

Based on the systems model of privacy (Newell, 1994), short-term and long-term privacy turbulence might have substantially different consequences. In terms of effects of perceived invasion upon youth information management, isolated experiences of invasion might cause temporary and reversible distress, whereas repeated failures to achieve desired privacy might result in entrenched impairments to interpersonal and intrapersonal regulatory systems. Therefore, youth's longer-term experiences of parental invasion are more likely to undermine family communication and predict greater secrecy and/or less disclosure to parents. In terms of youth information management effects upon perceived invasion, youth might win a fleeting sense of autonomy and avoid invasion experiences through greater concealment (Dietvorst et al., 2018; Finkenauer et al., 2002), but parental anxieties (Hawk, 2017) and the high psychosocial costs (Finkenauer et al., 2002, 2005) associated with reduced communication might paradoxically make it difficult for them to maintain long-term privacy control. It is also important to note that, in Chinese contexts, reducing communications with parents represents a detachment from the family (see Koepke & Denissen, 2012). This might be less compatible with Chinese cultural norms, compared to cultures that more strongly emphasize youth agency and independence (e.g., Qin et al., 2009). Consequently, Chinese youth might face cultural constraints on their ability to claim sole ownership of informational boundaries, which could complicate the ability to gain protection against future invasions through secrecy and non-disclosure (cf. Dietvorst et al., 2018). In order to contribute further information on the direction and valence of longitudinal associations between privacy invasion perceptions and multiple information management behaviors among Chinese youth, the present study utilized RI-CLPM to examine within-person effects at longer (i.e., six-month) time intervals than employed by earlier research using this analytic approach (e.g., Dietvorst et al., 2018).

Current Study

Existing studies regarding longitudinal associations between privacy invasion and adolescents' information management have potentially reported inaccurate estimates of intra-family fluctuations, lacked adequate information regarding longer-term within-person effects, and paid little attention to non-WEIRD families, all of which might lead to inferential fallacies. The current research attempted to address these limitations by investigating longer-term, within-person associations between Chinese adolescents' information management and perceptions of parental invasion. This study used three-waves of data collected at six-month intervals from adolescents in a city located in Shandong Province, which is relatively less economically developed and globalized compared with the metropolises where most Chinese family research has been conducted (e.g., Beijing, Hong Kong, and Shanghai). This study applied RI-CLPM analysis to disaggregate within-person fluctuations from stable, between-person differences. A conventional CLPM was additionally analyzed and compared with RI-CLPM to examine the importance of differentiating multilevel effects. To extend previous studies on family privacy management focusing solely on single information management behaviors, this research simultaneously included disclosure, secrecy, and perceived parental invasion in one model. Regarding parent-driven processes, this study followed previous literature in Chinese contexts, expecting that greater perceptions of parental privacy invasion would predict later within-person decreases in adolescents' disclosure (Hypothesis 1) and later increases in secrecy (Hypothesis 2). Given a lack of consensus concerning the valence of effects, this study explored youth-driven processes (i.e., disclosure and secrecy effects upon perceived invasion) as open questions without a priori hypotheses (RQ1, from disclosure to perceived invasion; RQ2, from secrecy to perceived invasion). Moreover, this research followed existing evidence in predicting that adolescents' lower levels of earlier disclosure would predict later within-person increases in secrecy (Hypothesis 3); and higher levels of secrecy would predict later within-person decreases in disclosure (Hypothesis 4).

Methods

Participants

This study utilized data collected as part of the "Facing Rejection" project, a longitudinal study of Chinese early-to-middle adolescents' interpersonal relationships and regulatory behaviors. Participants were recruited from two junior high schools in Shandong Province, China (39.80% from an urban

school, remainder from a rural school). The valid sample consisted of 289 adolescents (50.30% male) in 7th-8th grade, aged from 12.25 to 14.92 years ($M_{\text{ageT1}} = 13.57$ years, $SD = 0.63$) at the first measurement. Most participants (58.10%) reported their families as consisting of two children, and 37.90% of them were the only child in their households. Only 3.10% of youth grew up in a family with three or more children. Most adolescents (76.30%) reported their subjective family socioeconomic levels as “average”, 12.50% rated as above average, and 11.20% rated as below average or having difficulty sustaining themselves. A majority of parents had middle school level of education (51.20% of fathers and 38.70% of mothers) and 24.70% of fathers and 24.50% of mothers had attended high school or vocational schools; 7.40% of fathers and 25.50% of mothers attended only primary school or did not attend school at all. Only 16.60% of fathers and 11.40% of mothers had a bachelor’s degree or higher. Moreover, more than half of parents engaged in manual labor (59.90% for fathers and 55.8% for mothers), and 38.90% fathers and 34.90% mothers had non-manual jobs, or were unemployed (1.10% for fathers and 9.20% for mothers). The household demographics in the current sample were largely consistent with those reported by the Weifang, Shandong Bureau of Statistics (2017), suggesting that the sample was generally representative of families in this region.

Procedure

Ethical approval for data collection was granted from the Human Ethics Review Board of The Chinese University of Hong Kong (Survey and Behavioral Research Ethics Approval Number: EDU2014-023). In contrast to a prior RI-CLPM investigation of privacy invasion and secrecy that utilized three assessments at three-month intervals, thus capturing relative short-term effects, the present study utilized three measurements conducted over one year, at six-month intervals. According to a systematic review exploring how observed effects of parenting depend on different measurement intervals, a six-month time lag is considered sufficient for capturing long-term changes (i.e., macro-level family processes; Boele et al., 2020). At each measurement point, permissions from youth, parents, and schools were obtained. Adolescents who agreed to participate completed a series of questionnaires under the guidance and supervision of a trained research assistant during their homeroom periods. Questionnaires took approximately 20 minutes to complete. Upon completion, they received sticker books as gifts for participation.

Measures

The current study applied a translation-back translation method to minimize discrepancies between the Chinese

scales and original versions. Since Cronbach’s alpha (α) would underestimate reliability of latent variables, this research used McDonald’s Omega (ω), which is an indicator of reliability that is robust to most of alpha’s statistical assumptions (Kalkbrenner, 2021). Information regarding reliability and English translations of all scales are available in Table S1 of the Supplementary Materials.

Perceived privacy invasion

Adolescents’ perceptions of parental privacy invasion were assessed with the Intrusiveness subscale of the Level of Expressed Emotion (LEE) questionnaire (Hale et al., 2007). As in prior research (e.g., Hawk, 2017; Laird et al., 2013b), three items of the original seven-item measure were omitted to avoid conflating perceived invasion with perceived monitoring. Adolescents reported their levels of agreement on four statements with a 4-point Likert scale (1 = *strongly disagree*; 4 = *strongly agree*). An example item is, “My parents intrude into my private matters”. The privacy invasion scale showed good reliability across measurements, with ω ranging from 0.82 to 0.85.

Adolescent information management

Adolescents reported on two information management behaviors, secrecy and disclosure. The reliability and construct validity of these secrecy and disclosure scales have been demonstrated in a previous study of Chinese adolescents (e.g., Hawk, 2017). The present study maintained the same scale items as this previous work, in order to more easily compare the results of cross-sectional and longitudinal research examining with similar (i.e., Chinese youth) populations. Secrecy was measured with five items adapted from the Self-Concealment Scale (Larson & Chastain, 1990), on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). An example item is “When something bad happens to me, I tend to keep it from parents”. Reliability¹ ranged from 0.66 to 0.72 across time points. Disclosure was assessed by four items adapted from Kerr and Stattin (2000), arranged on a 5-point scale (1 = *never*; 5 = *very often*) and modified to emphasize adolescents’ spontaneous and voluntary disclosures to parents (Tilton-Weaver et al., 2014). An example item is “How often do you tell your parents, without them asking, what you do in your free time and with whom?”. The scale showed acceptable reliability over time, ranging from 0.79 to 0.83.

¹ Based on one reviewer’s recommendation, an item-by-item examination was conducted for the reliability of secrecy scale; no item deletions meaningfully improved reliability. Therefore, all items were retained in order to maintain consistency with previous research.

Plan of Analysis

This research employed Mplus version 8.0 (Muthén & Muthén, 1998–2017) to model longitudinal associations among adolescents' reports of invasion perceptions, disclosure, and secrecy across three measurement points. This study used the Full Information Maximum Likelihood (FIML) estimation with robust standard error (MLR) due to the positively skewed distribution of invasion perceptions at all measurements. For each construct, items with factor loadings above 0.30 were considered salient and meaningful (Brown, 2015). For the model evaluation, fit was considered acceptable if comparative fit index (CFI) and Tucker-Lewis index (TLI) values were at or above 0.90; root mean square error of approximation (RMSEA) and standardized root mean squared residual (SRMR) values were at or below 0.08 (Kline, 2016). The S-B χ^2 difference (Δ S-B χ^2) test with alpha set at 0.05 was employed to compare nested models (Hu & Bentler, 1999).

First, missing values and patterns of the data were analyzed. Within the whole sample, 94.12% of the participants' reports were complete across the three measurements. A maximum of 3.80% of cases ($N = 11$) were missing for each variable. Little's (1988) Missing Completely at Random (MCAR) test was non-significant $\chi^2(433) = 464.50$, $p = 0.14$ and the normed Chi-square showed a good fit ($\chi^2/df = 1.1$) between sample scores with and without imputation (Bollen, 1989), indicating that the MCAR could be assumed. Next, a single Confirmatory Factor Analysis (CFA) that included all constructs was performed to test the longitudinal measurement invariance of the instruments. All measurements attained residual invariance across time (see details in the Tables S2, S3 in the Supplementary Materials), meaning that the scales were appropriate to test the longitudinal relations and interplays between key constructs. Finally, intraclass correlations (ICCs) were calculated for each observed variable across waves. In the current study, ICCs were 0.48 for invasion perception, 0.61 for disclosure, and 0.47 for secrecy, which indicated that approximately 48–61% of the variation in key variables stemmed from between-person differences, and the within-person change accounted for 39–52% of the variation. Based on previous research (e.g., Hamaker et al., 2015; Rote et al., 2020), the proportion of within-person variation was sufficient to run RI-CLPM.

The main analyses were conducted in the following steps. First, in order to compare current results with prior research using conventional CLPM (e.g., Hawk et al., 2013), this study simultaneously included invasion perceptions, disclosure, and secrecy in one single CLPM analysis. Considering that the parameter estimation in CLPM is based on aggregated variances within and between individuals, however, significant paths might indicate either

within-family effects, between-family effects, or both. Next, following the same procedure used in a previous study of privacy invasion and secrecy (Dietvorst et al., 2018), RI-CLPM analysis examined the same model. Comparisons of fit between RI-CLPM and CLPM (i.e., nested models) were conducted via Δ S-B χ^2 tests (Satorra & Bentler, 2001). RI-CLPM extends CLPM with random intercepts to capture trait-like, individual differences, which allows it to disentangle effects at the individual and group levels (Hamaker et al., 2015). In contrast to CLPM, lagged effects in RI-CLPM represent within-person fluctuations over time (e.g., whether a teenager who perceives his/her parents as being relatively more intrusive than usual subsequently disclose to parents less than is typical for that adolescent), while correlations among the random intercepts represent the stable differences between adolescents (e.g., whether adolescents who perceive more parental invasion than their peers also disclose less to parents than their peers do). In order to demonstrate whether conventional CLPM analyses led to flawed interpretations, this study directly compared CLPM results with those of RI-CLPM.

Results

Descriptive Information and Model Results

Descriptives and correlations are reported in Table 1. According to the parsimony principle, pathways were constrained over time to simplify the CLPM and RI-CLPM. Comparisons between time-invariant models and freely estimated models showed that over-time equality constraints on stability paths, cross-lagged paths, and within-person correlated residuals did not deteriorate the model fit of either the CLPM, Δ S-B $\chi^2(12) = 18.84$, $p = 0.09$ or RI-CLPM, Δ S-B $\chi^2(12) = 14.75$, $p = 0.27$. Therefore, the more parsimonious models with full over-time equality were chosen. The fit of the final constrained CLPM was acceptable S-B $\chi^2(21) = 67.52$, $p < 0.001$, CFI = 0.93, TLI = 0.90, RMSEA = 0.09, and SRMR = 0.05 (full results of the CLPM are provided in Fig. S1 in the Supplementary Materials). The constrained RI-CLPM showed good model fit S-B $\chi^2(15) = 16.13$, $p = 0.37$, CFI = 1.00, TLI = 1.00, RMSEA = 0.02, and SRMR = 0.04.

Random Intercept Cross-Lagged Panel Model

The standardized model coefficients of RI-CLPM are graphically depicted in Fig. 1. Compared to the CLPM, the time-constrained RI-CLPM significantly improved the model fit Δ S-B $\chi^2(6) = 49.06$, $p < 0.001$, indicating that separating stable between-person differences from within-person variance could better represent the data. At the between-person level,

Table 1 Descriptives and Correlations for Perceived Privacy Invasion, Secrecy, and Disclosure among Adolescents

Variables	1	2	3	4	5	6	7	8	9
Correlations									
1. Invasion T1	–								
2. Invasion T2	0.51***	–							
3. Invasion T3	0.36***	0.56***	–						
4. Secrecy T1	0.26***	0.26***	0.19**	–					
5. Secrecy T2	0.26***	0.35***	0.25***	0.48***	–				
6. Secrecy T3	0.20**	0.30***	0.50***	0.40***	0.52***	–			
7. Disclosure T1	-0.19**	-0.18**	-0.18**	-0.41***	-0.37***	-0.26***	–		
8. Disclosure T2	-0.28***	-0.23***	-0.23***	-0.31***	-0.43***	-0.32***	0.57***	–	
9. Disclosure T3	-0.15*	-0.19**	-0.30***	-0.31***	-0.27***	-0.41***	0.59***	0.67***	–
Descriptives									
10. <i>M</i>	2.03	1.96	1.96	2.58	2.46	2.51	2.92	2.89	2.93
11. <i>SD</i>	0.64	0.64	0.62	0.76	0.75	0.76	0.90	0.88	0.91
12. Reliability (ω)	0.82	0.85	0.85	0.66	0.70	0.72	0.79	0.81	0.83

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

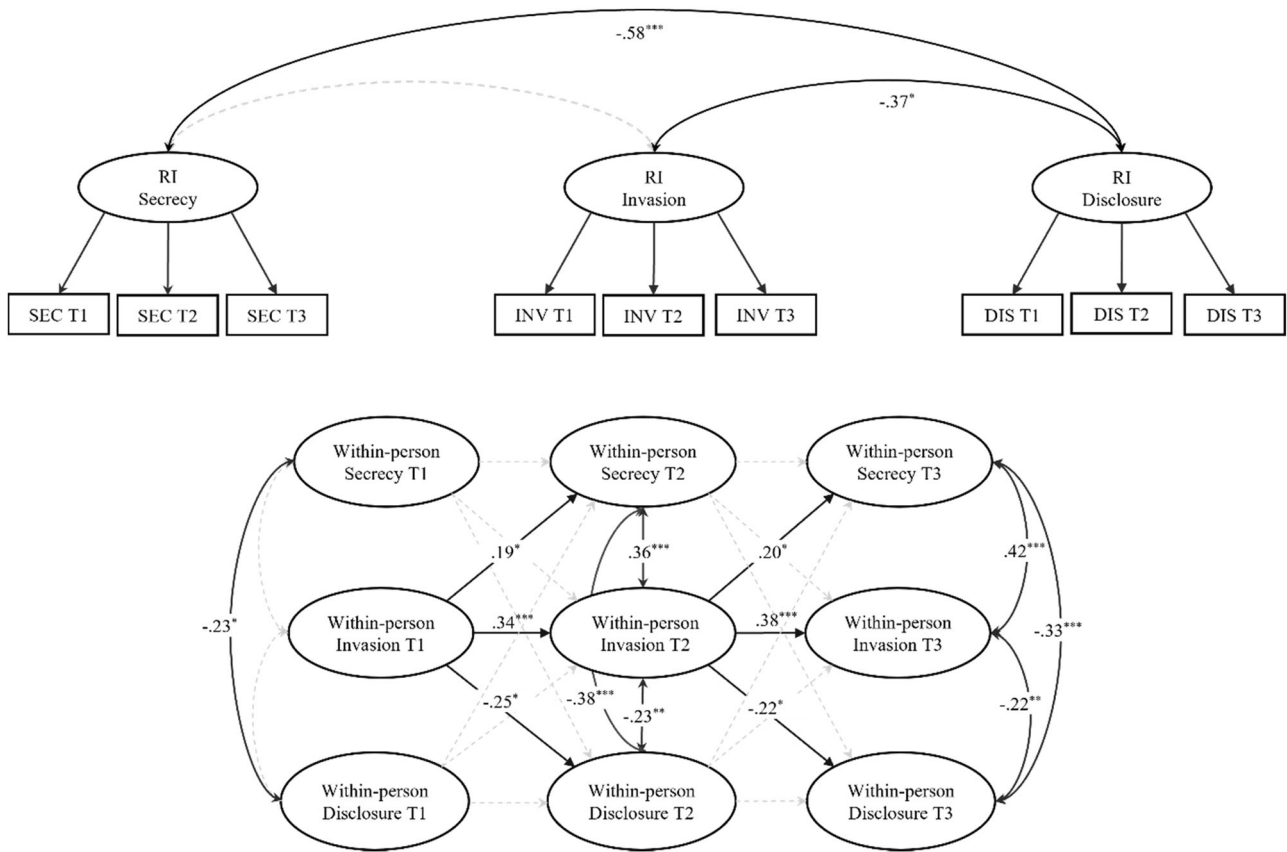


Fig. 1 Random Intercept Cross-lagged Panel Model with Standardized Coefficients. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. RI = Random intercept. Correlations among random intercepts represent stable between-

person differences. Solid lines indicated significant effects. Dashed lines signify non-significant paths

adolescents with higher levels of invasion perceptions (relative to other adolescents) reported less disclosure ($p = 0.01$) compared to their peers. Additionally, youth with lower overall levels of disclosure reported more concealment from parents,

compared to peers ($p < 0.001$). The between-person association between secrecy and invasion was not significant ($p = 0.15$).

At the within-person level, stability paths for invasion perceptions remained significant across all time points.

Secrecy showed concurrent negative associations with disclosure at each time point ($ps < 0.05$), suggesting that when a particular adolescent was engaging in more concealment than was usual for them, that adolescent also engaged in less voluntary disclosure to parents than usual. Moreover, invasion perceptions were positively correlated with secrecy ($ps < 0.001$) and negatively associated with disclosure ($ps = 0.005$) at T2 and T3, indicating that when an individual adolescent was feeling more invaded than was usual for them, they also showed lower levels of disclosure and higher levels of secrecy than usual. Consistent with the CLPM results regarding parent-driven processes, the RI-CLPM (see Table 2) showed that greater invasion perceptions (relative to the adolescents' own average levels) predicted lower levels of later disclosure ($ps = 0.02$) and higher levels of later secrecy ($ps = 0.03$). The cross-lagged effects from the two information management behaviors to adolescent later perceptions of invasion ($ps = 0.18$ to 0.25), as well as the interplays between disclosure and secrecy, were not significant ($ps = 0.22$ to 0.87). Overall, the RI-CLPM² results indicated that within-person privacy management processes were unidirectional rather than reciprocal, from invasion perceptions to adolescents' subsequent information management but not vice-versa.

² To further explore potential gender and location (i.e., urban versus rural areas) differences in family privacy management processes, multi-group analyses were conducted using gender and location as moderators of the time-invariant RI-CLPM. To first examine moderation, fit indices of a fully unconstrained model (i.e., parameters were freely estimated across gender or location) were compared to a fully constrained model (i.e., parameters were constrained as equal between boys and girls or between urban and rural areas). Adding constraints on all parameters across gender did not worsen the model fit, $\Delta S-B\chi^2(18) = 20.75$, $p = 0.29$, $\Delta CFI = -0.003$, $\Delta RMSEA = 0.02$, indicating non-significant differences in effects between boys and girls. Adding constraints on all parameters across urban and rural groups significantly worsened the model fit, $\Delta S-B\chi^2(18) = 31.45$, $p = 0.03$. Additional explorations then separately added constraints to stability paths $\Delta S-B\chi^2(3) = 2.10$, $p = 0.55$, cross-lagged paths $\Delta S-B\chi^2(6) = 2.52$, $p = 0.87$, and between-person correlations $\Delta S-B\chi^2(3) = 4.71$, $p = 0.20$ across locations, with none of these constraints worsening the model's fit. However, constraints on within-person correlations across location worsened model fit, $\Delta S-B\chi^2(6) = 20.31$, $p = 0.002$, $\Delta CFI = -0.02$, $\Delta RMSEA = 0.03$. Wald tests showed that the within-person correlations between perceived invasion and disclosure and disclosure and secrecy did not differ between groups ($ps > 0.25$), but the within-person correlations between perceived invasion and secrecy showed location differences, Wald (2) = 8.78, $p = 0.01$. Perceived invasion held stronger within-person correlations with secrecy among urban adolescents ($B = 0.16$, $SE = 0.04$, $p < 0.001$), compared to rural youth ($B = 0.08$, $SE = 0.03$, $p = 0.006$). This indicates that urban (compared to rural) adolescents engaged in relatively more secrecy that was typical for them when they concurrently perceived their parents to be more intrusive than usual, but cannot disentangle the direction of these associations.

Sensitivity Analyses

In order to explore whether the main effects were robust, sensitivity analyses were conducted for RI-CLPM using time-invariant covariates (i.e., age at T1, gender, and location). Although the coefficients of within-person pathways changed slightly after adding covariates to the model, the significance of these paths remained unchanged. The cross-lagged paths continuing to show significant associations from earlier invasion perceptions to adolescents' later decreased disclosure ($p = 0.03$) and increased secrecy ($p = 0.04$), suggesting no substantive differences in within-person estimates for the alternative model. Model fit and estimated effects are provided in Fig. S2 in the Supplementary Materials.

Discussion

Adolescents might reactively adjust their information management behaviors in response to perceived parental privacy invasions (Hawk, 2017; Hawk et al., 2013; Son & Padilla-Walker, 2021), prompt invasive parental behaviors via their reduced communication (Hawk et al., 2013), and/or use these informational strategies to proactively protect themselves against future invasion episodes (Dietvorst et al., 2018). These within-person processes might be heterogeneous across different timeframes and cultures. However, previous studies have often conflated multilevel effects, lacked information about longer-term effects within families, and largely ignored privacy dynamics in non-WEIRD families. Given that disclosure and secrecy can differentially predict multiple dimensions of adolescent's adjustment and family functioning, existing knowledge gaps in privacy management might result in inaccurate interpretations of youth behaviors and ineffective recommendations for practice. This study therefore examined within-person and longer-term associations among Chinese adolescents' perceptions of parental privacy invasion, disclosure, and secrecy to parents. The results of the RI-CLPM analysis largely supported the existence of parent-driven effects, in which Chinese youth respond to perceived privacy invasions by adjusting their information-management behaviors.

At the within-person level, when particular adolescents perceived more privacy invasion than was usual for them, they subsequently engaged in more secrecy and less disclosure with parents than was typical for their own relationships. Contrary to prior research, however, this study did not find any youth-driven effects from adolescent information management to later changes in perceived invasion. Moreover, while earlier research using CLPM suggested a developmental shift from lower disclosure to

Table 2 Parameter Estimates for Constrained RI-CLPM Linking Privacy Invasion (INV), Disclosure (DIS), and Secrecy (SEC)

Parameters	<i>B</i>	<i>SE</i>	<i>p</i>	β	<i>B</i>	<i>SE</i>	<i>p</i>	β	<i>B</i>	<i>SE</i>	<i>p</i>	β
Cross-Lagged Path	T1 → T2				T2 → T3							
INV → DIS	-0.21^a	0.09	0.02*	-0.25	-0.21^a	0.09	0.02*	-0.22				
INV → SEC	0.22^b	0.10	0.03*	0.19	0.22^b	0.10	0.03*	0.20				
DIS → INV	-0.06 ^c	0.05	0.25	-0.06	-0.06 ^c	0.05	0.25	-0.05				
SEC → INV	0.09 ^d	0.06	0.18	0.09	0.09 ^d	0.06	0.18	0.10				
DIS → SEC	-0.10 ^e	0.08	0.22	-0.10	-0.10 ^e	0.08	0.22	-0.08				
SEC → DIS	0.01 ^f	0.08	0.87	0.02	0.01 ^f	0.08	0.87	0.02				
Stability Path	T1 → T2				T2 → T3							
INV	0.35^g	0.09	0.000***	0.34	0.35^g	0.09	0.000***	0.38				
DIS	-0.13 ^h	0.10	0.22	-0.17	-0.13 ^h	0.10	0.22	-0.11				
SEC	0.16 ⁱ	0.11	0.14	0.16	0.16 ⁱ	0.11	0.14	0.16				
Correlation/ Correlated Change	T1				T2				T3			
INV with DIS	-0.03	0.03	0.30	-0.10	-0.06^j	0.02	0.005**	-0.23	-0.06^j	0.02	0.005**	-0.22
INV with SEC	0.07	0.05	0.14	0.20	0.11^k	0.02	0.000***	0.36	0.11^k	0.02	0.000***	0.42
DIS with SEC	-0.09	0.04	0.03*	-0.23	-0.10^l	0.03	0.000***	-0.38	-0.10^l	0.03	0.000***	-0.33
Between-Person Correlation	Across Waves											
INV with DIS	-0.08	0.03	0.01*	-0.37								
INV with SEC	0.05	0.04	0.15	0.39								
DIS with SEC	-0.19	0.04	0.000***	-0.58								

Time-invariant random intercept cross-lagged panel model (RI-CLPM). Equal superscripts refer to parameter constraints. Significant effects are shown in boldface. 95% Confidence interval can be derived from $B \pm 1.96 \times SE$

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

later increases in secrecy (e.g., Laird et al., 2013a), the RI-CLPM analysis showed only concurrent within-person associations and a stable between-person association between these constructs. These findings indicate that adolescents might adjust communication behaviors simultaneously, rather than sequentially. At the between-person level, adolescents who reported less disclosure relative to others also concealed more and experienced higher levels of invasion overall, whereas the correlation between secrecy and perceived invasion was not significant. These inconsistent associations between secrecy and perceived invasion at different levels underscore the need to distinguish these multilevel family processes, and also suggest that the longitudinal links between privacy invasion and secrecy identified in prior CLPM research might be primarily occurring within adolescents, rather than reflecting relative differences between youth.

Parent-Driven Processes

Traditional Chinese concepts of privacy are hierarchically structured within families, with asymmetrically permeable boundaries between parents and children (Chan, 2000). This construction, which is aligned with cultural values regarding family interdependence and children’s fulfillment of

filial piety, might diminish Chinese adolescents’ agency in privacy management. Contradicting these notions, however, the current results suggest Chinese adolescents’ attempts at defense against perceived parental intrusions. These findings, indicating that “young people tend to reject the absolute form of filial obligations” (Wang & Hsueh, 2000, p. 66), might challenge the stereotype of Chinese youth being highly subservient to parents’ informational demands. Indeed, despite being socialized in a context where family relationships are close-knit and vertically structured, Chinese youth place considerable emphasis on privacy and desire control over information to which they have primary or sole access (prior to disclosure to parents), such peer relationships, free-time activities, and school performance (Tang & Dong, 2006). Even if they acknowledge parents’ rights to know such information, Chinese youth likely still desire the ability to actively determine how (much) information communicated to parents. When youth perceive a loss of this control, they might utilize information management behaviors that increase distance from parents in order to maintain or reinforce desired privacy boundaries (e.g., Hawk, 2017; Ying et al., 2015).

The current findings on parent-driven processes echoed prior studies based on Communication Privacy Management in cultures where individualistic values are more strongly

endorsed (Hawk et al., 2013; Ledbetter et al., 2010; Ledbetter & Vik, 2012). Although explicit cross-cultural comparisons are still needed, results suggest that adolescents' desires to maintain individual privacy might be similar across different contexts. Indeed, establishing individual boundaries and claiming ownership of private spaces might be a developmentally normative part of adolescents' individuation (Petronio, 2002), and maintaining a private life can contribute to various aspects of psychosocial development, such as identity formation (Koepeke & Denissen, 2012) and self-regulation (Newell, 1994). In contrast, acts of privacy invasion indicate parents' claims of ownership over children's private matters and beliefs about children's obligations to conform (Tang & Dong, 2006), which might thwart adolescents' opportunities for individuation. Notably, the current study sampled youth from a less culturally traditional region of China (Obschonka et al., 2019). While interregional comparisons of Chinese family privacy dynamics are needed in future studies, adolescents from families in more globalized areas (e.g., first-tier Chinese cities), who might hold more democratic attitudes toward privacy rules and boundary coordination, could potentially react even more negatively or subversively to perceived parental invasions than the current sample of adolescents.

While current findings were in line with earlier CLPM research on privacy invasion and secrecy conducted among Dutch adolescents at year-long intervals (Hawk et al., 2013), they were inconsistent with an earlier RI-CLPM study, conducted at three-month intervals, which did not detect parent-driven effects at the within-person level (Dietvorst et al., 2018). A potential explanation for this discrepancy is that the effects of invasion on communication behaviors only crystallize over a relatively longer period. Indeed, the systems model (Newell, 1994) suggests that individuals might effectively recover from specific, singular experiences of privacy invasion. Associations between impaired interpersonal functioning and privacy invasion might become more ingrained as invasion episodes accumulate over time, however, making recovery in the family system increasingly difficult. In other words, repeated parental intrusions into adolescents' private lives might produce more entrenched disruptions to family communication, in the longer run. Although explicit, multi-timescale comparisons are still required, this study contributes to the literature suggesting the short-term and long-term associations between maladaptive parental practices and children's outcomes might be different or even opposing (e.g., Granic & Patterson, 2006).

Youth-Driven Processes

In contrast to fairly strong parent-driven effects, the present research did not find significant within-person effects of

adolescents' information management behaviors on later invasion perceptions. On the one hand, perceptions of invasion were generally more stable over time than youth's information management behaviors, potentially making it more difficult to predict changes in these perceptions. On the other hand, the asymmetric effects concerning parent-driven processes versus youth-driven processes might also mirror the hierarchical structure of Chinese family privacy. Indeed, cultural traditions empower Chinese parents' control over children's information. They might be reluctant to relinquish their authority (Tang & Dong, 2006), weakening adolescents' attempts to modify collective privacy boundaries and guard against later invasion experiences. In other similar scenarios that reflect parent-youth expectancy misalignments and tension (e.g., conflicts), Chinese parents typically are the final decision makers, even if adolescents object (Yau & Smetana, 2003, 1996).

Previous research found that greater secrecy predicted within-person decreases in Dutch adolescents' invasion perceptions three months later (Dietvorst et al., 2018), suggesting that youth secrecy might serve a proactive and protective function against feelings of privacy invasion. This study did not replicate these youth-driven effects, however, suggesting that reducing the permeability of informational boundaries might not be an effective strategy to protect against invasion feelings in the longer run. Different cultural contexts in which these family dynamics were examined might account for this inconsistency regarding the functions of secrecy. Indeed, cross-cultural research suggests that early adolescents in interdependence-oriented cultures might accrue fewer psychological benefits from increased autonomy than their counterparts in independent cultures, where such increases are relatively normative (Qin et al., 2009). In interdependent cultures, early adolescence is seen as a turning point in maturation, during which children are expected to fulfill family obligations (Wang et al., 2020), including self-disclosure to parents (Yeh & Bedford, 2003). As such, withholding information contradicts filial piety expectations that parents should be co-owners of children's informational boundaries, implying a rebellion against parental authority and disruptions of family interdependence. Such filial obligations might impose moral pressure on Chinese youth that prevents them from gaining a true sense of control over privacy, or reaping the same adaptive advantages as their Western counterparts (e.g., Dietvorst et al., 2018; Finkenauer et al., 2002). Collectively, potential conflicts and compromises between youth's privacy needs and constraints stemming from cultural norms represent a dialectical tension inherent in privacy dynamics (Petronio, 2010).

Practical Implications

This research provided empirical evidence regarding detrimental effects of perceived parental invasions upon

adolescents' open communication behaviors. The subsequent reductions in disclosure and increases in concealment suggest that, even in cultures oriented toward interdependence, adolescents are willing to engage in culturally unfavorable behaviors to protect their individual privacy boundaries. Considering that youth's failure to achieve desired levels of privacy might precede maladaptive communication, parents and practitioners require actionable steps to avoid impaired family functioning. Since giving adolescents more autonomy in privacy management might correspondingly encourage their voluntary communication, parents should acknowledge youth's explicit expressions of dissatisfaction or disagreement with behaviors that they consider to be intrusive, and potentially loosen privacy rules and ownership claims in a corresponding manner. Youth's emerging expectations for autonomy also mean that some previously acceptable parenting behaviors might need to be reduced or modified over time (see also Hawk, 2017; Hawk et al., 2013). Despite cross-cultural research suggesting that adolescents in interdependent cultures hold later autonomy expectations, compared to youth from independent cultures (e.g., Feldman & Rosenthal, 1991), the present research focusing on individual-level privacy processes can highlight the considerable heterogeneity that exists even in interdependent cultures. Therefore, it is likely more appropriate to consider youth's specific needs, instead of relying on general country- or culture-level assumptions.

These findings also provide empirical support for practitioners and clinicians to implement effective treatment aimed at identifying and modifying intrusive parenting practices. Practitioners might assist parents in recognizing early adolescence as a period in which youth must develop self-determination and self-direction, and that increasing privacy needs are largely normative. They could help parents adjust the privacy-related beliefs that might manifest as overtly invasive actions. For example, parents who view youth's privacy demands as an illegitimate tactic to conceal information are prone to perceive themselves as having a stronger right to access children's private domains (Tang & Dong, 2006). This study also highlights the necessity of constructing mutually acceptable privacy boundaries within families. Practitioners might utilize current findings to help youth appropriately respond to parental invasion, thereby avoiding potential mental and relational costs stemming from problematic family communication patterns. When adolescents feel a sense of invasion, or are frustrated with having restricted privacy at home, practitioners can guide them in discussing these issues with parents openly to recalibrate family privacy boundaries, rather than asserting desired boundaries unilaterally. Indeed, discrepancies in perceptions of privacy boundary ownership between parents and children are less likely to diminish in the absence of mutual negotiation and attempts at compromise formation (Petronio, 2002).

Limitations, Strengths, and Future Directions

The current study has several notable strengths. Firstly, this research considered dual information management strategy use by simultaneously examining both secrecy and disclosure, which extends prior studies on family privacy processes that only examined concealment. This study also highlighted adolescents' spontaneous communicative behaviors, particularly the voluntary aspect of youth disclosure (cf. Kerr & Stattin, 2000). This emphasis on volition is important, particularly in hierarchically structured privacy contexts where youth disclosure might otherwise be the result of explicit parental demands or moral pressures. Moreover, the current study sampled adolescents from a relatively less globalized region of China, where traditional norms still prevail; this represents a useful context in which to explore tensions between culturally desirable, co-owned family privacy boundaries versus youth expectations of individual, less permeable private spheres. Lastly, this study contributes to research that highlights the importance of analyzing and interpreting family processes at the within-person level separately from stable, between-person differences. Indeed, this study suggests that a within-person perspective might provide more detailed insights into the directionality and rank-order changes of effects. Such information is valuable for designing effective family interventions or treatments. This study also points out the necessity of using analytical tools that can pinpoint the correct levels of inference, in order to draw accurate conclusions regarding family processes and avoid related fallacies (Frijns et al., 2020).

Notwithstanding these strengths, there are also several limitations that should be addressed in future investigations. First, there is considerable cultural and economic diversity throughout China, as well as between various cultures high in interdependent orientation. Different conceptual representations of privacy, norms for family interactions, and parenting beliefs between these different locations could alter the patterns of associations observed in the present research. Therefore, while the present study provides insight into family privacy processes in Chinese areas with great adherence to traditional Confucian values, those findings are not necessarily applicable to families in other Chinese regions, or in other cultures oriented toward interdependence. Additionally, the relatively lower reliability of the secrecy measure at the first measurement point might have led to an underestimation of certain effects of earlier secrecy on other constructs in the model. The parent-driven effects from invasion to secrecy were sufficiently robust, however. Moreover, secrecy and perceived parental invasion were measured using relatively broader, global measures without distinguishing which domains of information youth were managing (e.g., personal, conventional,

prudential, or moral domains; Smetana et al., 2006) or spheres of privacy youth felt parents were intruding upon (e.g., spatial or mental privacy; Tang & Dong, 2006). Similarly, the disclosure scale mixed youth disclosures of personal, peer, and school issues. Prior studies have included school issues as a topic over which Chinese adolescents desire control over how and when to communicate with parents (Tang & Dong, 2006) and suggested that sharing of school-related information constitutes an important component of family communication (Cheung et al., 2013). However, future research should examine topic-specific information management within Chinese families, since parent-youth (dis)agreements concerning parental authority and disclosure obligations can differ from one issue to the next (Hawk et al., 2016; Rote & Smetana, 2016; Tang & Dong, 2006). Lastly, this research solely focused on youth's reports without considering parents' viewpoints. Indeed, adolescents' feelings of parental invasiveness and parents' actual invasion are separate constructs that hold different associations with youth disclosure. Similarly, parents might perceive adolescents' information management differently than youth, which could influence their use of certain intrusive practices (Finkenauer et al., 2005; Hawk et al., 2016). Moreover, using only youth reports might lead to over- or under-estimations of parental invasiveness. Perceptions of privacy invasion likely rely heavily on subjective interpretations of informational ownership that change as youth recognize an increasing number of issues as private (e.g., Tang & Dong, 2006). Particularly as expectations for autonomy increase in early adolescence, youth might be particularly reactive to parental behaviors based on privacy expectations that were established in earlier developmental periods (e.g., Hawk et al., 2016, 2008). Conversely, parents might also engage in covert surveillance that goes unnoticed by children (e.g., Hawk et al., 2016; Rote & Smetana, 2018). Therefore, parental reports can contribute to a comprehensive understanding of the frequency or extent to which privacy invasions occur. Future research could consider multiple informants to better understand these family processes.

Conclusion

Prior research on longitudinal associations between adolescents' perceptions of parental invasion and information management have often reported potentially biased estimates of intra-family fluctuations, have lacked sufficient information on longer-term within-person effects, and have not sufficiently considered these processes in non-WEIRD families. To address these limitations, this study applied RI-CLPM to examine within-person and privacy management dynamics over one year among Chinese early

adolescents. Results showed that adolescents' stronger perceptions of invasion predicted less disclosure and more secrecy later on, suggesting that perceived parental invasion might produce disruptions in family communication. These findings also indicate a tension between culturally desirable expectations regarding interdependent family privacy and Chinese adolescents' assertions for individual privacy. This study underscores the need for parents and practitioners to assist youth in establishing mutually acceptable family privacy boundaries, in order to facilitate adolescents' adaptive interpersonal functioning.

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Authors' Contributions S.P. designed the study, conducted statistical analysis, interpreted data, and drafted the manuscript; S.H. conceived of and designed the study, supervised data collection, and drafted the manuscript; Y.W. arranged participant recruitment and conducted data collection. All authors read and approved the final manuscript.

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Data Sharing and Declaration The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author upon reasonable request.

Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethics Approval This research has gained ethical approval from the Human Ethics Review Board of The Chinese University of Hong Kong (Survey and Behavioral Research Ethics Approval Number: EDU2014-023).

Informed Consent The current study obtained informed consent from all participants and gained permission from adolescents, parents, and schools.

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