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# Why is young maternal age at first childbirth a risk factor for persistent delinquency in their male offspring? Examining the role of family and parenting factors

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## ABSTRACT

**Background** Children born to mothers who were younger than average at their first childbirth are at increased risk for future persistent delinquent behaviour, but explanations for this remain unclear.

**Aims** Our aim was to identify possible family and parenting variables that may help explain this relationship. We hypothesised that parental stress, large number of children in the home, low socioeconomic status (including neighbourhood problems) and poor parenting would account for the link between early first motherhood and their offspring's delinquency.

**Methods** Four hundred and sixty-two boys were selected from the Pittsburgh Youth Study, a longitudinal study of a random sample of school boys in Pittsburgh, initially assessed half-yearly and then annually from 7 to 19 years of age, using self-reporting and other reporting methods. Indirect effect models were used to test relationships between variables.

**Results** Higher levels of parental stress, poorer parent-child communication and caring for a larger number of children all mediated the relationship between maternal youth and persistent delinquency by their boys, but only explained about 20% of it.

**Discussion** At least partial explanations of the relationship between a mother's age at first childbirth and persistent delinquency in her male offspring suggest that future research should test whether early interventions with younger mothers to decrease their

*sense of stress in parenting and improve their capacity for communication with their child(ren) may help to prevent persistent delinquency in their boys. Programmes designed to help young women make more informed and planned decisions about their pregnancies should also be evaluated. Copyright © 2015 John Wiley & Sons, Ltd.*

## Introduction

It has been well established that children born to younger mothers are at an increased risk for adverse developmental outcomes, from adjustment problems in childhood (Tremblay et al., 2004) to more serious problems, such as delinquency, in adolescence and young adulthood (Moffitt & Caspi, 2001). A large body of research has shown that the mother's young age at first childbirth, rather than the mother's age at subsequent births, is an important predictor for delinquent behaviour in their offspring (Nagin et al., 1997; Jaffee et al., 2001; Pogarsky et al., 2003; Tremblay et al., 2004; Dónofrio et al., 2009; Barnes & Morris, 2012). Explanations of this, however, remain unclear, especially with respect to more serious and persistent delinquency.

Children born to young mothers are often exposed to a variety of risk factors that have been associated with early childbearing as well as with development of delinquent behaviour (Loeber, 1990; Loeber & Farrington, 2000; Stouthamer-Loeber et al., 2001; Hoeve et al., 2009). Children of young mothers, for example, often grow up in poverty and live in high-crime neighbourhoods (Geronimus & Korenman, 1992; Lee, 2010). It may be that these variables confound the association between early childbearing and child delinquency (Coley & Chase-Landsdale, 1998; Coyne & Dónofrio, 2012). In addition, young mothers are more likely than older mothers to be single parents who care for many children and have difficulty managing stress, which may reduce their capacity for adaptive parenting (Manlove et al., 2000; Spencer et al., 2002). They have also been shown to exhibit more conflicted parent-child communication, and lower parental supervision than older mothers (Osofsky et al. 1991; Berlin et al., 2002; Lewin et al., 2013).

To our knowledge, only three longitudinal studies have examined factors that may help explain why children of young mothers are at increased risk for becoming delinquent. These studies indicated that low socioeconomic status (Nagin et al. 1997; Jaffee et al., 2001), increased family size (Nagin et al., 1997), a greater number of caretaker changes (Jaffee et al., 2001; Pogarsky et al., 2003), and problematic parenting practices and parent-child interactions (Jaffee et al., 2001) partly, but not fully, accounted for the link between early childbearing and offspring delinquency (Jaffee et al., 2001; Pogarsky et al., 2003). More studies are needed, therefore, to improve understanding of the mechanisms underpinning the link between maternal age at first childbirth and child delinquency. Pogarsky et al. (2003) argued that many of the risk factors that have been tested are interrelated and studies should examine them in combination rather than singly. In addition, previous

studies have only examined the association between maternal age at first childbirth and *any* engagement in delinquency. As delinquency generally peaks in adolescence but rapidly declines in young adulthood (Farrington, 1986; Piquero et al., 2007), studying engagement in delinquent behaviour at a single time point fails to distinguish transient offenders from persistent delinquents (Moffit, 1993).

We designed our study to advance understanding of why being young at first childbirth is associated with offspring delinquency in several ways. First, we examined whether exposure to a wider range of potential risk factors in early childhood helps explain the association between young maternal age at first birth and subsequent delinquency, secondly, we focused on persistent delinquency (according to multiple sources) as the outcome, thirdly, we adopted multivariate indirect effects modelling to examine which risk factors help to explain the association between young motherhood and persistent delinquency and, fourthly, we controlled for factors that may result in an overestimation of the effect such as race or early delinquent behaviour. Our hypothesis was that poor parenting practices, parental stress, having a large number of children in the home and low economic status (including neighbourhood problems) would account for the link between young first motherhood and persistent delinquency in the offspring.

## **Methods**

### *Participants*

Participants are part of the youngest cohort of the Pittsburgh Youth Study, a longitudinal study of first-grade boys who were recruited from the Pittsburgh public schools in 1987–1988 (Loeber et al., 2008). A random sample of 849 boys completed a multi-informant (parent, teacher and self-report) screening of early conduct problems. The 247 boys who scored within the upper 30% on the screening and a roughly equal number of boys (256) randomly selected from the remainder were selected for follow-up. The racial/ethnic composition of the follow-up sample ( $n = 204$ , 41% Caucasian;  $n = 280$ , 56% African-American;  $n = 19$ , 4% other) was similar to that of the screening sample. Further descriptive statistics for the follow-up sample are presented in Table 1 (see also Loeber et al., 2008). As our study was focused on characteristics of the biological mother that may account for the association between young age at first childbirth and offspring delinquency, the analysis was limited to the 462 boys living with their biological mother at the time of the first interview.

### *Procedures*

Following screening, boys and their primary caretakers were each interviewed privately in their homes, biannually for the first 4 years and then annually for the next 9 (17 assessments total), spanning ages 7 (*mean* 7.46, standard

Table 1: Descriptive statistics and intercorrelations for all study variables

	1	2	3	4	5	6	7	8	9	10	M	SD	%
1. Maternal age at first birth	1	—									20.73	4.12	
2. African-American	-0.397***	1	—								—	—	54.40
3. Number of children in home	-0.190***	0.049	1	—							1.57	1.14	—
4. Neighbourhood problems	-0.270***	0.443***	0.130**	1	—						1.50	0.51	—
5. Maternal stress	-0.147**	0.055	0.040	0.186***	1	—					1.74	0.34	—
6. Positive communication	-0.202***	0.184***	0.094*	0.252***	0.443***	1	—				1.47	0.27	—
7. Poor supervision	-0.120*	0.157**	0.097*	0.181***	0.192***	0.278***	1	—			1.25	0.37	—
8. Socioeconomic status	0.375***	-0.224***	-0.182***	-0.201***	-0.203***	-0.303***	-0.189***	1	—		35.34	13.09	—
9. Delinquency at screening	-0.101*	0.144**	0.053	0.096*	0.132**	0.144**	0.163**	-0.132**	1	—	—	—	9.90
10. Persistent delinquency	-0.304***	0.227***	0.170***	0.179***	0.236***	0.254***	0.159**	-0.249***	0.295***	1	2.50	2.67	—

Note: SD = standard deviation; M = Means.  
 \*\*\* $p < 0.001$ . \*\* $p < 0.01$ . \* $p < 0.05$ .

deviation [SD] 0.55) to 19 years (*mean* 20.08, *SD* 0.61). Informed consent was obtained at each assessment. We used data from the first assessment following screening for all explanatory variables (see succeeding text). Persistent delinquency was assessed combining information from parents, boys and official criminal records from the first 17 assessments (see succeeding text for description). The data collection procedures were approved by the Institutional Review Board of the University of Pittsburgh.

## **Measures**

### *Dependent variable*

#### *Delinquency persistence*

The primary outcome was the number of assessment years the boys engaged in any moderate/serious delinquent behaviour (see Appendix 1), hereinafter referred to as persistent delinquency. This was based on a previously developed seriousness classification system (Loeber et al., 2008) combining items from the Self-Report of Antisocial Behaviour and Self-Report of Delinquency (Loeber et al., 2008), parent-report on an extended version of the Child Behaviour Checklist (Achenbach & Edelbrock, 1983) and official criminal records from a combination of juvenile, state and FBI sources. Official records were matched to the self-report and parent-report data using the interview dates. The initial eight assessment phases that took place every 6 months were combined into four annual waves prior to counting the number of years boys engaged in moderate/serious delinquency (total years possible = 13). For the parent and self-report measures, moderate/serious delinquency included behaviours such as gang fighting, dealing in stolen goods, stealing something worth more than \$5, breaking and entering, fraud, robbery, rape and auto theft. For the official records, moderate and serious delinquency included theft, burglary, simple and aggravated assault, homicide, robbery, (sexual) assault and rape.

### *Independent variable*

*Maternal age at first childbirth* was established retrospectively from the Demographic Questionnaire (Loeber et al., 1998; Loeber et al., 2008), at time of the first assessment.

### *Potentially mediating variables*

*Socioeconomic status.* A caretaker-reported demographic questionnaire (Loeber et al., 1998) was used to collect information about family characteristics. The primary caretakers' educational attainment and current occupation were coded numerically and used to calculate the Hollingshead (1975) Index of

Socioeconomic Status. Higher scores represent higher socioeconomic status. When more than one caretaker was present, the higher of the two scores was used.

*Number of children under 18 years in the home* at the time of first assessment, regardless of relationship to the participant child, was recorded according to maternal report.

*Neighbourhood problems* at the time of first assessment were recorded using the parent-reported Neighbourhood Impressions Questionnaire (Loeber et al., 2008). This 17-item questionnaire allows scoring on a 3-point Likert scale (range 1 – *not a problem* to 3 – *a big problem*) according to environmental qualities such as abandoned buildings, unemployment, racial tension and criminal activities in the neighbourhood. The average of all items was calculated. The measure had high internal consistency in the current sample ( $\alpha = 0.91$ ).

*Maternal stress* was measured using the 14-item Perceived Stress Scale (Loeber et al., 2008). Items include the biological mother's perception of the amount of stress she experienced and her capacity to cope with stressful events over the past month, with each item being rated on a 5-point Likert scale (range 1 – *never* to 5 – *often*). Some items were reverse scored before calculating the average of all the items, so that a higher average represents more maternal stress. The measure showed good internal consistency in our sample ( $\alpha = 0.82$ ).

*Positive communication*. The parent-reported Revised Parent–Child Communication Form (Loeber et al., 2008) was used to assess the mother's tendency to use an emotionally responsive and open communication style while discussing problems or disagreements with her child. The measure consists of 18 items rated on a 3-point Likert Scale (range 1 – *almost never* to 3 – *always*). Again, some item scores were reversed before calculating the average of all items so that higher average scores invariably indicated better parent–child communication. The internal consistency in our sample was 0.74 ( $\alpha$ ).

*Maternal supervision*. The parent-reported Involvement and Supervision Questionnaire (Loeber et al., 2008) was used to assess how the mother monitored the boys' activities. The scale has eight items, which were rated using a 5-point Likert scale (range 1 – *almost never* to 5 – *almost always*). All items were reverse scored before averaging so that higher scores indicated poorer supervision. The internal consistency of the questionnaire was modest ( $\alpha = 0.54$ ), partly because most mothers reported never leaving their (young) child unsupervised. The scale has, nevertheless, previously shown robust associations with delinquency (Loeber et al., 2008).

### *Control variable*

*Child's race* was based on responses to the Caretaker Demographic Questionnaire (Loeber et al., 1998; 2008) at time of the first assessment and for our study coded African-American (1) or Caucasian/Other (0).

### Data analysis

First, we examined the bivariate association between maternal age at first childbirth and delinquency persistence. Pearson and point-biserial correlation analyses were performed to inspect whether a young maternal age at first birth was related to the measured risk factors and race. To determine whether exposure to risk factors accounted for links between maternal age at first birth and later delinquency persistence, indirect effects models (Hayes, 2009) were estimated using Mplus version 5.21 (Muthén & Muthén, 2006). First, we conducted single risk factor indirect effects models. Maternal age at first childbirth was regressed onto each individual risk factor, and delinquency persistence onto the targeted risk factors and maternal age at first birth. These single-factor models were estimated to determine whether risk factors helped account for the association between maternal age at first childbirth and delinquency persistence before accounting for their interrelatedness. Next, a multivariate indirect effects model was estimated by including all risk factors in the model simultaneously. In all models, African-American race and moderate and serious delinquency at first assessment were included as covariates. A bootstrapping procedure was used to test for indirect effects, with 1000 bootstrapped samples being taken (Mallinckrodt et al., 2006; Preacher & Hayes, 2008). Statistical significance was met when the 95% confidence interval around the indirect effect parameter estimate did not include zero (Thoemmes et al., 2010). The percentage of the association between delinquency persistence and maternal age at first childbirth accounted for by each risk factor in the model (and all risk factors in combination) was calculated by dividing the estimate found for each indirect effect by the regression parameter between this maternal age and persistent delinquency in the single model (MacKinnon & Dwyer, 1993; MacKinnon et al., 2004).

## Results

### *Descriptive statistics and bivariate associations*

Descriptive statistics and intercorrelations between study variables are presented in Table 1. Cohen's (1988) criteria were used to interpret the strength of the correlations, taking  $r = 0.10$ – $0.29$  as small,  $r = 0.30$ – $0.49$  as moderate and  $r \geq 0.50$  as strong. The association between maternal age at first childbirth and delinquency persistence in boys was small, but significant. Maternal age at first childbirth was significantly related to all risk factors, with small to moderate effect sizes.

### *Indirect effects for individual risk factors (single model)*

Maternal age at first childbirth significantly predicted persistent delinquency in boys ( $\beta = -0.155$ ,  $CI = -0.211$ – $0.099$ ), after controlling for race and moderate/serious delinquency at screening. Next, we examined whether each risk

factor acted as an indirect effect when examined in separate models. The number of children in the home, maternal stress, positive communication and family socioeconomic status all accounted for a significant portion of the association between young first motherhood and delinquency persistence in boys, after controlling for race and delinquency prevalence at screening. In all cases, however, maternal age at first birth remained a significant predictor of persistent delinquency ( $\beta = -0.129$ – $-0.141$ ,  $p < 0.05$ ) (Table 2).

*Indirect effects for full model*

When all risk factors were tested simultaneously in a multivariate indirect effects model (Figure 1), maternal age at first childbirth remained a significant predictor of delinquency persistence in boys, although the strength of the association was significantly reduced ( $\beta = -0.109$ , CI =  $-0.169$ ,  $-0.053$ ). Indirect effect analysis indicated that a large number of children in the home, high levels of maternal stress and poor parent–child communication (marginally significant) partially accounted for the relationship between maternal age at first childbirth and delinquency persistence in boys, after controlling for race and delinquency at screening (Table 2). These three risk factors together accounted for 20% of the effect of maternal age at first childbirth on delinquency persistence in boys.

**Discussion**

We examined several possible risk factors to explain the relationship between maternal age at first childbirth and delinquency persistence in boys, taking into

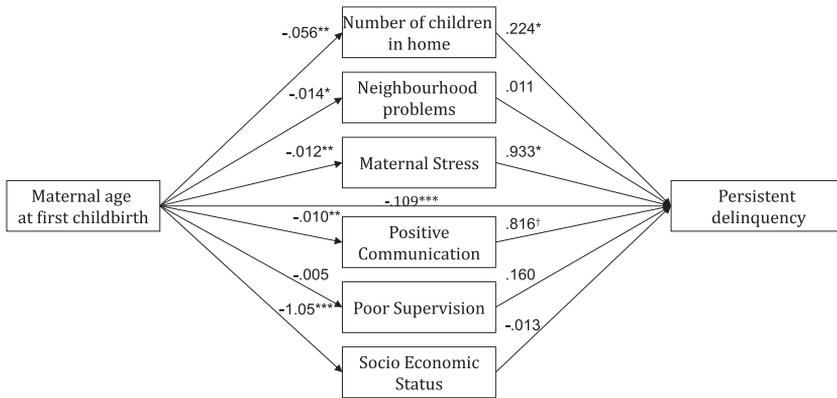
Table 2: Univariate and multivariate tests of indirect effects between maternal age at first birth and persistent delinquency in boys

Total indirect effects (maternal age at first birth → mediating factor → persistent delinquency)	Indirect effects: single mediator model		Indirect effects: full multivariate model	
	B	95% CI	B	95% CI
Number of children in home	-0.014*	-0.035, -0.005	-0.012*	-0.033, -0.004
Neighbourhood problems	-0.004	-0.018, 0.001	0.000	-0.010, 0.007
Maternal stress	-0.016*	-0.036, -0.005	-0.011*	-0.029, -0.002
Positive communication	-0.015*	-0.032, -0.005	-0.008**	-0.023, 0.000
Poor supervision	-0.003	-0.013, 0.001	-0.001	-0.009, 0.002
Socioeconomic status	-0.026*	-0.050, -0.007	-0.014	-0.035, 0.006

Note: In all models, race and moderate/serious delinquency at screening were included as a covariate.

B = unstandardised regression coefficient; CI = confidence interval.

\* $p < 0.05$ . \*\* $p < 0.10$ .



**Figure 1:** Multivariate indirect effects model. All parameter estimates are unstandardised, and after controlling for race and delinquency prevalence at screening ( $p < 0.05$ )

account their interrelatedness. Our hypotheses that children of younger mothers are at increased risk for growing up in families with a large number of children and at increased risk for experiencing higher levels of parental stress and poorer parent–child communication than children of older mothers, and that these variables would mediate any relationship between maternal age at first childbirth and persistent delinquency of the offspring were sustained.

Maternal stress often results from the conflicting developmental tasks that these mothers need to fulfil. On the one hand, young mothers are challenged by the demands of being a parent, while on the other, normative developmental tasks need to be accomplished (Coley & Chase-Landsdale, 1998; Secco & Moffat, 2003). Parents who consistently experience stress may be more likely to lash out at their children in anger and have difficulties effectively managing the competing demands associated with maintaining a household. A chaotic and even hostile family environment may, in turn, negatively impact on the emotional functioning of the child, leading to development of disruptive and delinquent behaviours. Help for parents to develop appropriate coping strategies for dealing with life’s stresses may be particularly important during early childhood.

The number of children in the home was also found to explain a portion of the link between maternal age at first childbirth and persistent male delinquency. Up to 50% of adolescent or young adult mothers have a further pregnancy within 2 years of their first (Stevens-Simon & White, 1991). High rates of repeated births are especially likely among African-American mothers (Kalmuss & Namerow, 1994). The use of long-lasting contraceptives (implants) is an effective way of helping these women to prevent subsequent pregnancies (Coard et al., 2000). Mothers who lack motivation to delay childbearing are, however, often those who are least likely to use hormonal methods of contraception (Stevens-Simon et al., 1998). Developing a cost-benefit analysis with the mother about the possibility of her delaying her second child may help here, as may the mother’s further

education, in particular, attainment of a higher education degree (Rigsby et al., 1998; Manlove et al., 2000). Because some teenage women may view motherhood as an effective way to fulfil an unmet emotional need and/or gain a sense of adult independence (Rodriguez & Moore, 1994; Merrick, 1995; Corcoran et al., 1997), prevention programmes should explore different motives for childbirth and discuss alternative strategies for developing emotional connections with others and a sense of personal mastery.

We also found that poor parent–child communication had a marginal role in explaining the link between maternal age at first childbirth and persistent delinquency, in line with findings from a meta-analysis by Hoeve et al. (2009) who identified an open and positive communication style as a protective factor against offspring delinquency. Previous studies have indicated that adolescent mothers are less expressive towards their children than adult mothers (Culp et al., 1991; Stevenson-Barratt and Roach, 1995) and their vocalisations are more harsh and ineffective (Culp et al., 1991). In addition, more emotional mismatches have been identified in adolescent mother–child than adult mother–child dyads. Specifically, adolescent mothers express more negative emotions when the child's expressions are positive or neutral. Young mothers may have lower sensitivity to the child's emotions or misinterpret emotional signals from the child (Crugnola et al., 2014).

Our study is the first study to examine whether the association between young maternal age at first childbirth and delinquency persistence from childhood through late adolescence can be accounted for by risk factors measured in early childhood. This makes the results particularly relevant for adapting secondary prevention efforts to target the needs of young mothers (Deković et al., 2011). Our work also, however, had several limitations. First, our findings are based on a cohort of first-grade boys selected from the Pittsburgh public schools in 1987–1988, half of whom scored in the upper 30% on a screening tool for antisocial behaviour. The findings may not be generalisable to other populations of young people and in particular not to girls or those living in different historical periods. Secondly, we are unable to conclude whether exposure to the risk factors measured was the direct result of early childbearing. Jaffee et al. (2001; 394) stated that 'characteristics that increase the risk of early childbearing may also be associated with later psychosocial consequences', so we acknowledge that studies should also examine how early risk factors interact with and shape future outcomes such as parenting behaviours and social-economic circumstances. Thirdly, although we examined a variety of risk factors across several domains, we were only able to explain about 20% of the variance in the relationship between young first motherhood and persistent delinquency in their boys. Potentially relevant mediating variables not assessed were maternal and paternal antisocial personality disorder. The fact that mothers with histories of delinquent behaviour tend to have children who are more physically aggressive (Tzoumakis et al., 2012) suggests that this could be a useful line of inquiry for the future.

Researchers have also examined the extent to which maternal age at first childbirth and offspring delinquency may be attributable to shared and non-shared environmental factors or genetic factors, finding that environmental factors within the nuclear family may be especially important mediators (Dónofrio et al., 2009). Finally, many variables in social scientific research are subject to measurement error. Errors in mediating variables, however, will affect both the path of the dependent and independent variable, resulting in an even greater attenuation of the parameter of the indirect effect (Hoyle & Kenny, 1999). This could lead to under-estimation of some mediation variables.

In summary, we identified a robust relationship between mother's age at first childbirth and persistent delinquency in their male offspring, and some explanatory variables. Future research should test whether early interventions for younger mothers that aim to decrease their sense of stress in parenting and improve their capacity for communication with their child(ren) may help to prevent persistent delinquency in their boys. In addition, programmes designed to help young women make more informed and planned decisions about their pregnancies, in particular generally delaying beyond their teenage years and reducing the frequency of their pregnancies, may assist in lowering persistent delinquency rates among their boys.

## Appendix 1. Overview of items of the SRA, CBCL and SRD

Items of delinquency measure	Item number
In the past six months, have you stolen or tried to steal a bicycle or skateboard?	SRA 4
In the past six months, have you gone into a building or somebody's house, yard, or garage and taken something that did not belong to you? If yes, what kind of building was it? if answered house or garage?	SRA 9
In the past six months, have you taken something from a car that did not belong to you?	SRA 10
In the past six months, have you snatched someone's purse or wallet or picked someone's pocket?	SRA 25
Participates in gang fights	CBCL 127
Takes vehicles for a drive without owner's permission	CBCL 134
Steals a bicycle or skateboard	CBCL 138
In the past six months, have you gone into or tried to go into a building to steal something?	SRD 12
In the past six months, have you stolen or tried to steal things worth between \$5 and \$50?	SRD 14
In the past six months, have you stolen or tried to steal something worth between \$50 and \$100?	SRD 15
In the past six months, have you stolen or tried to steal something \$100 or more?	SRD 16
In the past six months, have you snatched a purse or wallet or picked a pocket?	SRD 18
In the past six months, have you taken something from a car that did not belong to you?	SRD 19
In the past six months, have you knowingly bought, sold or held stolen goods or tried to do any of these things?	SRD 20

(Continues)

Appendix 1: (Continued)

In the past six months, have you gone joyriding, that is, taken a motor vehicle, such as a car or motorcycle, for a ride or drive without the permission of the owner?	SRD 21
In the past six months, have you stolen or tried to steal a motor vehicle such as a car or motorcycle?	SRD 22
In the past six months, have you used checks illegally or used a slug or fake money to pay for something?	SRD 23
In the past six months, have you used or tried to use credit cards or bank cards without the permission of the owner?	SRD 24
In the past six months, have you attacked someone with a weapon or with the idea of seriously hurting or killing them?	SRD 26
In the past six months, have you used a weapon, force, or strong-arm methods to get money or things from people?	SRD 28
In the past six months, have you been involved in a gang fight?	SRD 30
In the past six months, have you physically hurt or threatened to hurt someone to get them to have sex with you?	SRD 32
In the past six months, have you had or tried to have sexual relations with someone against their will (other than those you just mentioned)?	SRD 33

Note: SRA = Self-Report of Antisocial Behaviour; SRD = Self-Report of Delinquency; CBCL = Child Behaviour Checklist.

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