Endogenous cool-off periods in ultimatum games

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What do we do?

- Ultimatum game, proposers can impose cool-off period on responders
- In previous research, cool-off periods were exogenously imposed by researchers
- In real life, individuals can make deliberate choices to impose waiting periods on others
- We tackle novel research questions:
  - How willing are individuals to impose endogenous cool-off periods on others?
  - Do offers change when cool-off is an option?
  - How does the possibility of imposing endogenous cool-offs affect bargaining breakdowns and earnings?
  - Are endogenously imposed cool-offs effective?

What do we find?

- How willing are individuals to impose endogenous cool-off periods on others?
  - About 40% imposes cool-off. Strategic choice, sorting.
- Do offers change when cool-off is an option?
  - Yes, there is a negative causal effect, offers are lower in TC treatment
- How does the possibility of imposing endogenous cool-offs affect bargaining breakdowns and earnings?
  - No effect on bargaining breakdowns and overall earnings, but significant negative effect on responder earnings
- Are endogenously imposed cool-offs effective?
  - No, there is no effect on acceptance rate
- Overall picture: instead of helping to solve conflicts, the possibility to create cool-off periods harms those in a less powerful position.

Cool-off periods

- Suggested as solutions for conflicts, e.g. dampen progression of vendettas (Bolle et al., 2014), reduce excessive punishments in PGG (Dickinson and Masclet, 2015), reduce bargaining breakdowns in UG (Grimm and Mengel, 2011; Neo et al., 2013; Oechssler et al. 2015 partially; Bosman et al. 2001 not).
- Intuition: they lower emotions such as anger, give time to reflect upon optimal decision.
- But emotions can have important role: punishments may deter free riding (e.g. Fehr and Gachter, 2000), fairness may constrain profit seeking by firms (Kahneman et al., 1986).

Endogeneous cool-off periods

- Cool-offs can be intentionally created to benefit one party at the expense of others
  - Friday news dump by politicians
  - Price hike announcements by companies
  - Manager: when to disclose information about lay-offs, or changes that may result in angry employees?
- Information receivers could react adversely to endogenous timing, so cool-down period could be ineffective or backfire.
  - Cf. Arad and Rubinstein (2017): some people consciously act contrary to nudges, as if in protest. See also Brehm (1966) psychological reactance
- Previous research focused on exogeneously imposed cool-offs, one cannot extrapolate.
- We investigate cool-off periods in endogeneous setting

Experimental design

- Ultimatum game: one person is proposer, the other responder.
- Need to divide 100 chips
- Asymmetry: each chip is worth 0.15 euro to proposer and 0.05 euro to responder (following Neo et al. 2013). Responder can accept or reject. In case of rejection, both players receive 0.
  - Used asymmetric ultimatum game to get high baseline rejection rate (it was 52% in first three rounds of Kagel et al, 41-42% in Neo et al. 2013). Did not seem to have mattered.

Experimental design

- Between subjects, 2 treatments: Control and TimingChoice (TC)
  - Control: Proposer proposes number of chips to responder. Responder learns the proposal and immediately makes accept/reject decision. Afterwards, there is a waiting period (to keep length the same across treatments)
  - TimingChoice: in addition to proposing a division, the proposer also chooses when the responder completes the waiting period:

Table: Timing Choice in TC-Treatment:

	1	**2**	**3**
Option Cool-Off	Responder learns proposal	Responder has Free Time	Responder submits accept/reject decision
Option No Cool-Off	Responder learns proposal	Responder submits accept/reject decision	Responder has Free Time

Sample

- Lab experiment with 376 subjects
- 150 in the Control (75 pairs) and 226 in the TC-treatment (113 pairs)
- Mostly undergrads. Main fields: science and engineering, economics and econometrics, and spatial sciences.

Raw decision statistics

Table: **Raw decision statistics**

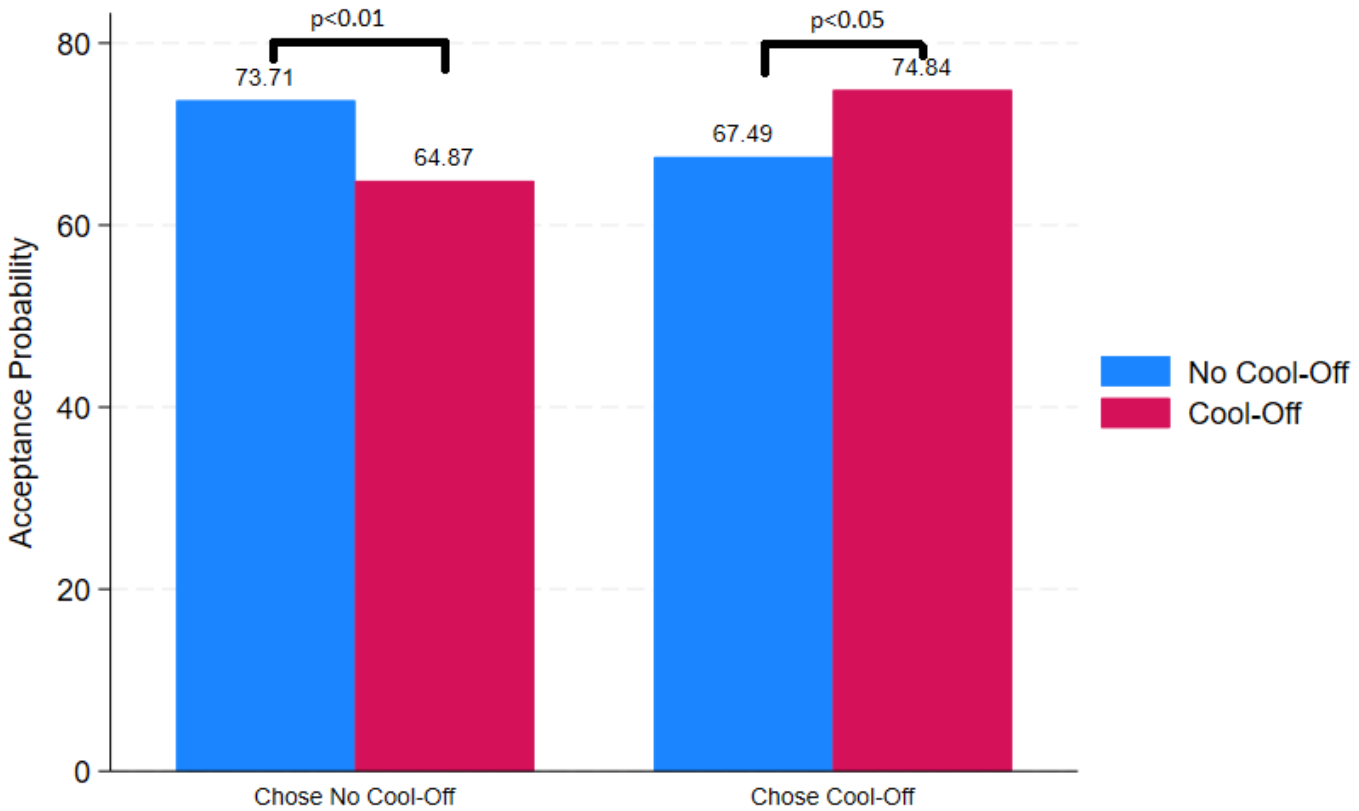
	Control	Timing Choice Overall	Timing Choice Cool-Off	Timing Choice No Cool-Off
Proposer : Timing Choice			39.8%	60.2%
Proposer : Chips Offered	54.7	48.5	42.5	52.4
Proposer : Share of Low Offers	44.0%	59.3%	68.9%	52.9%
Responder : Accept	74.7%	69.0%	65.2%	71.6%

Note: Low Offers means offers of 50 chips or less.

How willing are individuals to impose endogenous cool-off periods on others?

- About 40% imposes cool-off
- Use survey questions to explore reasons
- To what extent considered the potential impact of the waiting period on the likelihood that the responder would reject offer?
  - Average 5.1 on 1-7 Likert scale, significantly different from midpoint of 4 ($p = 0.000$)
- Heterogeneity in beliefs about impact $\rightarrow$ sorting

Heterogeneity in proposer beliefs about the effect of a cool-off period



Note: Bars show the mean proposer beliefs about the acceptance probability of a proposer's offer with and without cool-off period, split by whether participants chose Cool-Off or No Cool-Off

Heterogeneity in proposer beliefs about the effect of a cool-off period

- Regressions controlling for offer size:
  - Acceptance probability in case of cool-off: those who chose cool-off estimate a significantly higher probability than those who did not choose it.
  - Acceptance probability in case of no cool-off: no significant difference, so it is not the case that the first group is generally more optimistic.
- How much would they have offered if they had made the opposite timing decision?
  - Those who chose cool-off would have offered on average 5.9 more chips without cool-off period (p=0.0000)
  - Those who chose no cool-off would have offered 4.7 more chips with a cool-off period (p=0.0418)

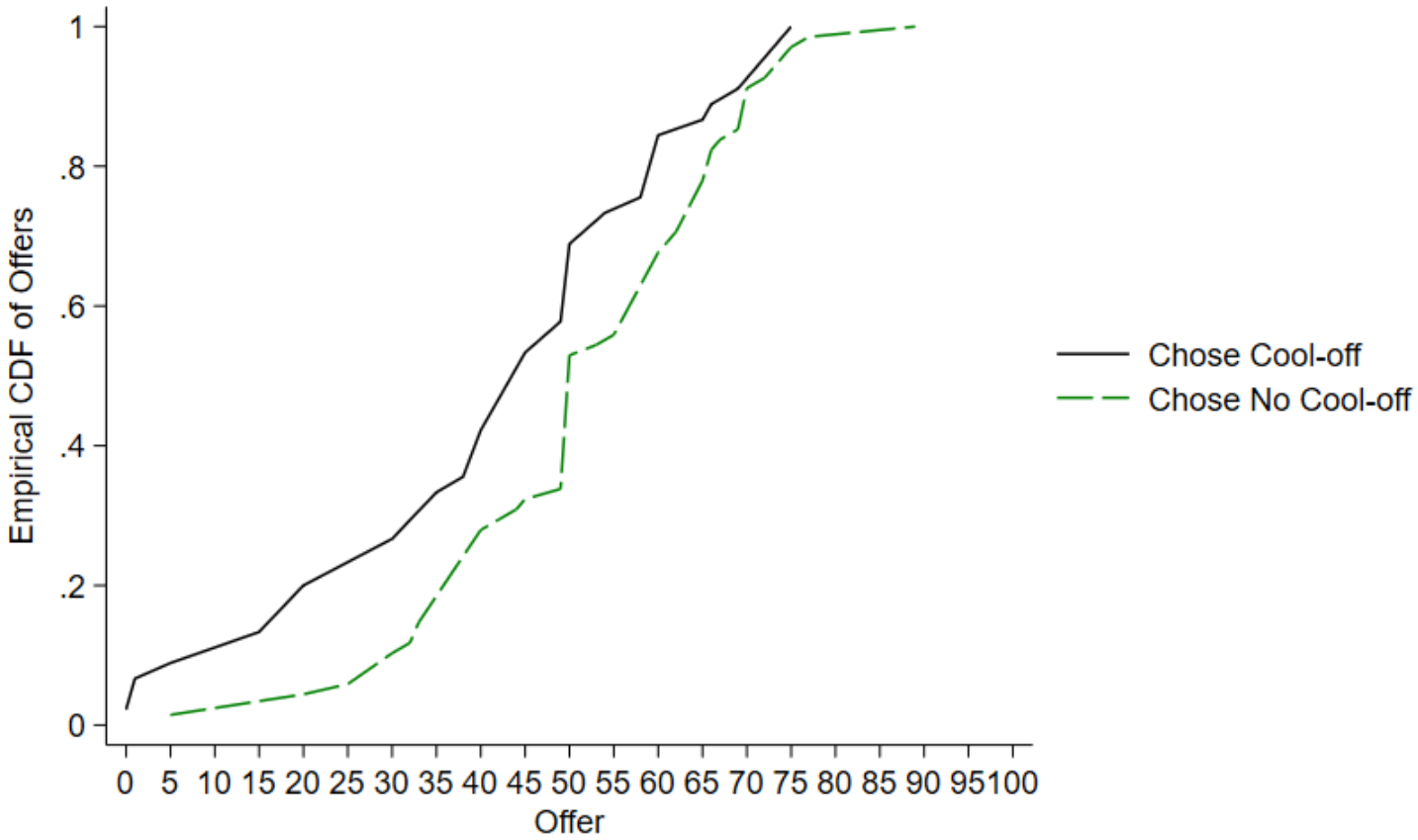
Do offers change when cool-off is an option?

OLS and probit, comparing offers in Control to TC treatment:

	(1) Chips Offered	(2) Low Offer
Timing Choice	-6.202**	0.386**
	(2.546)	(0.188)
Observations	188	188
R-squared	0.029	

Notes: (1) shows OLS regression of chips offered on a Timing Choice dummy, (2) shows probit regression of a Low Offer (50 chips or less) dummy on a Timing Choice dummy, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Heterogeneity analysis: CDF proposer offers for those choosing Cool-Off versus those choosing No Cool-Off



How does the possibility of imposing endogenous cool-offs affect bargaining breakdowns and earnings?

- Acceptance rate: 75% in Control, 69% in TC, no signif. diff. (Pearson test, p = 0.237)
- Average earnings in Control and TimingChoice treatments:

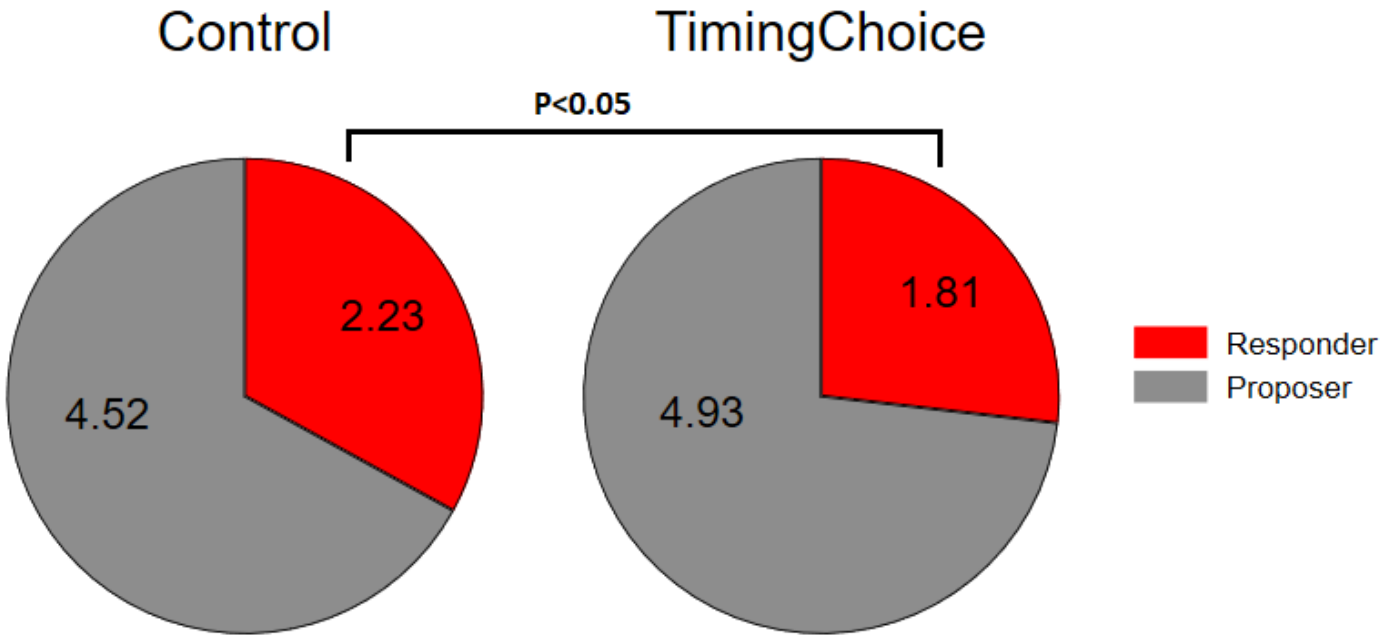


Table with earnings and t-tests

	Timing Choice	Control	T-value Control vs. TC
Earnings	3.37 (3.09)	3.37 (3.35)	0.0105
Proposer Earnings	4.93 (3.95)	4.52 (3.10)	-0.7617
Responder Earnings	1.81 (1.41)	2.23 (1.41)	1.9962**

Notes: Standard deviations in brackets, in the final column the t-value of the comparison of earnings in the TC treatment and the Control treatment are presented, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Are endogenously imposed cool-offs effective?

Probit regression comparing acceptance rate in control to TC-CoolOff

	(1) All Offers: Probability of Acceptance	(2) Low Offers: Probability of Acceptance	(3) High Offers: Probability of Acceptance
TC-Cooloff	0.069	0.275	-0.306
	(0.286)	(0.337)	(0.480)
Offer	0.032***	0.036***	0.046
	(0.008)	(0.014)	(0.032)
Observations	121	64	57

Notes: Probit regressions compare acceptance rate of responders in the TC-treatment who were exposed to a Cool-Off to responders in the control treatment. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Summary of findings

- How willing are individuals to impose endogenous cool-off periods on others?
  - About 40% imposes cool-off. Strategic choice, sorting.
- Do offers change when cool-off is an option?
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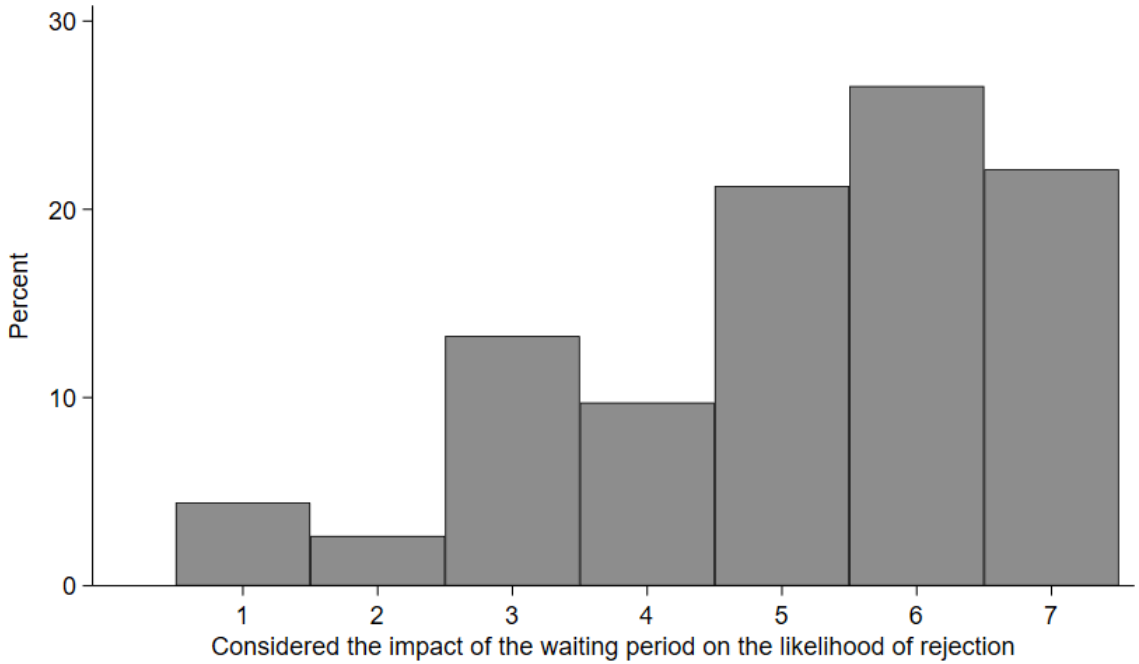
Thank you for your attention!

- Question/comments?

Extent to which proposers considered impact of waiting period on rejection rate



Note: Proposer answers to question how much they considered the impact of waiting period on the likelihood that responder would reject their offer, ranging from "Not at all" (1) to "Very Much" (7)

Figure 3 Neo et al.

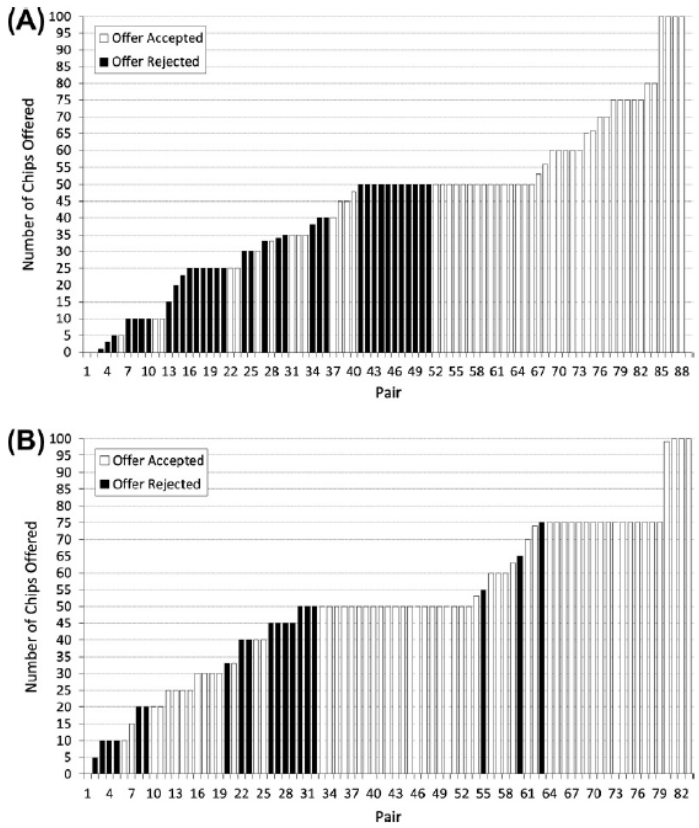


Fig. 3. Number of chips offered and accept/reject decision per proposer-responder pair in the (A) Immediate. (B) Delay treatments of the ultimatum game for Experiment 3.