The double-edged token: An investigation of cognitive conflict in technology-mediated decisions

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Background

- **Decentralized governance** promises **improved equitability** and **accountability** over centralized models (Bacq & Aguilera, 2022)
- A new form of organization, called **"Decentralized Autonomous Organization"** (DAO), promises to **improve the efficiency** and **transparency** of decentralized governance (Hassan & De Filippi, 2021; Ellinger et al., 2024)
- DAOs use a **new voting system** in which **"digital tokens"** (NFTs) are used to manage voting influence and rights (intrinsic) as well as financial rewards (extrinsic) (Santana & Albareda, 2022)
- **Decisions are enforced** using **smart contracts** that are set prior to voting (Gregory et al., 2024)
- As **community-based organisations**, DAOs rely on **incentivised repeated voluntary contributions** from their community members (Hsieh et al., 2018; Shah, 2006)

- **Governance tokens** are used as the **main reward mechanism**/ incentive system (Ellinger et al., 2024)
- Individuals are faced with a usage decision between:

| **Selling tokens to realize financial gain** | **Using tokens for self-realization/voting** |

- The **dual-purpose**, **motivationally opposed** nature of tokens (Ellinger et al., 2024) is expected to **cause significant cognitive conflict** (Festinger, 1962) during the usage decision
- **Cognitive conflict** leads to undesired behavior like **freeriding** (Ellinger et al., 2024) or **financial optimization** (Han et al., 2025)
- **Token design** could **reduce cognitive conflict** by limiting tokens financial value (e.g., Chen et al., 2025)

Research Question

| 1. Decentralized governance requires repeated voluntary contributions | 2. Freeriding is caused by misaligned incentives | 3. Availability of a highly flexible, digital incentive for motivation realignment | → | **Can governance token design be used to encourage active governance contributions by reducing cognitive conflict?** |

Approach

Incentivized Lab Experiment with 23 students under deception (pilot)

Shimmer 3+ GSM Sensors & Self-Report-Measure

Deception scenario used to replicate DAO decision-making:
- A new fund is established to improve student welfare, with the condition that students must be involved in distributing the funds
- Participants (Students) are asked to evaluate several proposed projects aimed at improving student welfare + answer additional questions in order to earn their voting rights for the final fund distribution
- They are then offered an additional 5€ (10€ + 5€) compensation if they choose to forfeit their voting rights
- Finally, they are asked to self-report their level of cognitive conflict experienced during the decision-making process

Results

- **Deception check:** Successful
- **45 %** of participants **rejected** the additional reward
- **No significant effects** of individual metrics or personality traits
- **GSM peaks** served as proxy for cognitive conflict - comparison between big five questionnaire and usage decision task
- **GSM amplitude:** Descriptive difference, but n.s. (p =.06)
- **GSM peaks:** Significantly more frequent during decision task, **t = 3.18, p = .005, d = 0.71**

Next Steps

1. **Replicate** the study with **adequate statistical power** (n = 35)
2. Conduct a **second experimental round** introducing **token design variations**:
   a. Delayed rewards
   b. Reward variability

Intended Contribution

1. **Demonstrate** the ability of **digital incentive design** to influence the **level of cognitive conflict** in decision tasks (cf. Braver et al., 2014)
2. Enable **token design experimentation** to optimize governance **tokens value** as an incentive (cf. Chen et al., 2025)
3. Demonstrate the **psycho-physiological implications** of **governance tokens dual-value nature** (cf. Ellinger et al., 2024)

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