Friends Don't Need Receipts:
The Curious Case of Social Awareness Streams in the Mobile Payment App Venmo

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We study the inclusion of a social awareness stream (SAS) in the peer-to-peer payment app Venmo. While SASs are prominent in many social network sites, such as Facebook and Twitter, Venmo's use offers an illustrative example of how SASs can be used in task-oriented apps, particularly in a domain, finance, which people often view as sensitive. Through interviews with 14 Venmo users and surveys of 164 peer-to-peer payment app users and 80 Venmo users, we find uses consistent with other SASs and uncover novel uses that reflect the unusual inclusion of an SAS within a utilitarian app for personal finance. For many users, the SAS is a flexible feature that creates an experience that blends their task-driven use with social benefits. People write purely functional transaction descriptions with strangers, while in transactions with friends, they sometimes craft playful descriptions that enhance their experience or perform their social relationships. The SAS provides opportunities for learning about how to use the application and for keeping up with friends. The results of this study extend the CSCW community's knowledge of SASs and offer guidance to designers considering use of SAS in a variety of applications.

1 INTRODUCTION

Designers include social awareness streams (SASs) in many services, from social network sites to applications that help people complete tasks. The SAS is often one of the main features people use in the site or app, such as in popular social networking sites like Facebook, Twitter, and Instagram. SASs are also often incorporated into apps which help people complete tasks, such as music sharing and streaming (e.g., Spotify, Last.fm), fitness and activity tracking (e.g., Strava, MyFitnessPal), and even personal finance (Venmo). SASs designed to support ritualistic use, such as catching up on news about friends or a stream of interesting photos, have been studied extensively in the social computing literature.

When used on platforms such as social networking sites, designed primarily to help people share and connect with others, social awareness streams can increase user engagement and retention [6]. However, disclosing some content, such as physical activity data or health status, can cause the sharer or viewer to

feel discomfort or even regret [14,36,40]. When using SASs, people often feel a tension between making content visible and maintaining privacy [6,13].

Uses and Gratifications Theory (UGT) dichotomizes motivations for using media as either ritualistic (e.g., "habitual and diversionary"), or instrumental (e.g., "goal-directed and purposeful") [31]. While SASs in applications used ritualistically are well understood, they are now appearing in applications used for tasks, such as fitness or financial apps. Many of these SASs involve sharing data that is known to present offline privacy or security concerns, e.g., when sharing location [2,19]. Thus, people may encounter different challenges and derive different benefits when using SASs in applications used more instrumentally. Understanding people's experiences with SASs in apps used instrumentally can guide design of these features and is an important complement to previous research on SASs in ritually used applications.

This research investigates people's uses of, and responses to, an SAS in the personal finance app Venmo. Venmo is a popular mobile payment app, handling about $20B in transactions in 2016 [30]. Venmo's SAS differs from "traditional" SASs in two ways. First, people often view the financial data at the center of the SAS as too private to share with others [21,41], yet Venmo provides feeds of all public transactions and those that friends have been involved in and shared. Second, Venmo is primarily used instrumentally, which contrasts with the habitual, ritualistic motivations for using many other services that contain an SAS [18,29]. Studying impressions and uses of Venmo's SAS can further researchers' and designers' understanding of how people use and feel about SASs beyond those in social networking sites.

To explore people's use of the Venmo SAS, we conducted two surveys (one of 164 mobile payment app users, one of 80 Venmo users), as well as interviews with 14 people who regularly use Venmo. Venmo's SAS has both positive and negative impacts on people's use of the mobile payment (mPayment) aspect. People experience awkwardness around sharing transactions and are often indifferent to seeing others' transactions. However, people benefit from seeing financial data in the SAS. For example, visibility into others' activities enables social learning, showing new users examples of how others use Venmo's SAS, such as including emoji in transaction descriptions. Social sharing can also remove some of the taboos associated with money by adding an element of playfulness to transactions.

We specifically contribute:

- An understanding of how users create content for an SAS in an instrumental tool. In Venmo transactions with strangers, users often want a record or documentation, so they write descriptions similar to a memo line of a check. Transactions with friends or family, however, more closely resemble SAS entries in media typically associated with ritualistic use, such as the Facebook feed.

- Extending our understanding of how people negotiate sensitive content in SASs. People negotiate the inclusion of financial data in Venmo's SAS by crafting transaction descriptions that are nonsensical, humorous, or otherwise unrelated to the transaction purpose. Design decisions, such as not including dollar amounts, further reduce privacy concerns.

- An understanding of how people perceive an SAS of others' transactions. People appreciate seeing the clever descriptions of close friends and transactions they were involved in. However, people are bored by the SAS if they are not close to the people involved in the transaction, cannot infer a possible meaning, or find the transaction purpose too mundane.

Beyond expanding our understanding of how people interact with SAS, these results can inform the design of social features in financial apps and the design of social awareness streams with potentially sensitive data.

2   BACKGROUND

We first describe Venmo and its SAS. We then contextualize the affordances of Venmo's SAS by describing prior research on Social Awareness Streams and personal finance.

2.1   Venmo and Its Social Awareness Stream

Venmo is a mobile payment app popular in the United States. Due to its prevalence amongst people in their teens, 20s and early 30s, Venmo is often referred to in popular press as "the payment app of the Millennials" [11,24,27]. There are two ways to initiate financial transactions in Venmo: sending an amount to another
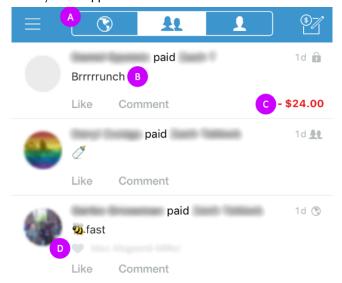
**Figure 1. Venmo contains (A) three social awareness streams: a public feed, a friends feed,
and a private feed. (B) All transactions include a description. (C) Private transactions also contain
the dollar amount. (D) Venmo contains common audience feedback mechanisms
of likes and comments.**

user and requesting an amount from them. Money can be sent to or requested from a Venmo-specific username, phone number, or email address via a search box. People can load the Venmo information of their phone contacts and Facebook friends so they are automatically recommended in the search box.

Venmo includes three social feeds: a *public feed*, a *friends feed*, and a *private feed* (Figure 1a). By default, all Venmo transactions are shared publicly. Anyone who opens the app to the public feed, including people who do not themselves use Venmo, can see these publicly shared posts. The privacy settings can be changed so that all posts are either shared only with a user's Venmo contacts, or even kept private. If posts are shared only with contacts, they still appear in a friends feed, whereas private transactions are only visible to the two parties involved in the transaction. If two users involved in a single transaction have differing privacy settings, Venmo applies the most restrictive level. Users can override their overall preference for any individual transaction, including after the transaction has been made.

Each transaction includes a description of what the payment is for in text, emoji, or both (Figure 1b). This description is required to complete the transaction, but Venmo does not enforce content requirements (e.g., someone could describe the transaction as "*nothing*"). Venmo recommends emoji when a common expense is entered as the description (e.g., Venmo suggests 🍕 when "pizza" is entered into the description and 💦🔧🔥 when "utilities" is entered). Overall, 30% of Venmo transactions include at least one emoji [37].

Regardless of a transaction's privacy, only the two people involved in a transaction can see the transaction's amount (Figure 1c). Transactions are persistent within the feed and scroll infinitely. A previous transaction may be difficult to revisit if a user or their contacts have many transactions. Venmo's SAS also includes likes and comments (Figure 1d), which are traditional audience feedback features in SASs.

The SAS in Venmo differs from other SASs in that it is driven by the app's financial functionality. Posting is dependent on using the app's core functionality, financial transactions. A user could make a trivial transaction to make a post (e.g., sending someone $0.01, or requesting $0.02), but only one participant in our studies reported ever doing this. Further, neither reading the feed nor sharing a transaction memo publicly or with friends is necessary to send or receive money.

On Venmo, people transact with both friends and businesses via the app [42]. Analysis of public transactions identifies a spectrum of use patterns, from regular users who create transactions for a variety of

expenses, to niche users who use Venmo with a small cluster of friends to pay for just a few things (e.g., bills among roommates). While this prior research describes a range of public uses of Venmo, it cannot describe people's experiences with the application and its SAS or their use of transactions that are private or shared only with friends.

2.2 Uses of Social Awareness Streams

People have many reasons for using apps and digital media. In Uses and Gratifications Theory (UGT), reasons for using technology are dichotomized as either *instrumental* purposes, which are "goal-directed and purposeful", or *ritualistic* uses, which are "habitual and diversionary" [31]. Similar to the UGT categorizations, Tang et al. dichotomize patterns of sharing behavior in apps designed for sharing location [35]. Apps are either "purpose-driven", defined by utilitarian purposes, or "social-driven", which involve sharing location because "*it is simply interesting or fun.*" People primarily use social networking sites containing SASs, such as Facebook and Twitter, ritualistically and socially [18,29].

These uses of SASs have been extensively studied by social computing researchers. SASs can provide a range of benefits to their users and to the site. People who create and contribute content often do so to increase their own visibility or to share personal information with people they know personally [6]. Social networking sites and other apps including an SAS often provide *social translucence*, which enables awareness of how others behave [15]. People often gain knowledge or understanding from viewing content in an SAS, or *social learning* [1]. By viewing activities of other users, new users in particular acclimate themselves to the social norms of a community [6].

However, the persistent visibility of content shared in SASs often complicates uses and opinions of SASs. When sharing personal data in an SAS, the desire for privacy is often in tension with a desire to present one's self honestly and accurately [13]. People often curate their content in SASs to present themselves positively [43]. For example, in Last.fm, some people stream music they otherwise would not, to present a particular image of themselves [34]. Although people are often concerned about privacy when sharing new types of data or in new apps, this concern typically fades as people become used to disclosing personal data [32].

SASs have also started showing up in applications that people use more instrumentally or purposefully, such as financial, coupons and saving money, or navigation apps [18]. As described earlier, Venmo includes an SAS, as does the deal website Groupon. The navigation app Waze uses a variation of the SAS that shows when friends last logged in or if they are driving. Health and activity tracking applications also leverage SASs, with tracked data appearing in the SAS of popular social networking sites, such as Facebook or Twitter [25,26] or in a dedicated SAS [3,9].

As SASs now appear in more types of applications, including those that help people complete tasks, we believe it is important for researchers and designers to understand how people experience SASs in these applications. While the design of the SAS in these instrumental apps resembles the SAS in social network sites and other apps used ritualistically, their integration in apps that support different uses may present users different benefits and challenges.

Many applications support both ritualistic and instrumental use, especially as they become platforms serving many related purposes. For example, though Facebook and its SAS are associated primarily with ritualistic use, people can also use other parts of the platform to find restaurant menus or make reservations, plan events, or participate in community action. In the music streaming application Spotify, the SAS of friends' recently played tracks may support the task of discovering new music, but it also can support feelings such as listening together or along with friends.

We selected Venmo because it represents an application used primarily instrumentally. That is, while Venmo presents a familiar feed, it is furthest from the previously studied and well-understood uses of SASs in the CSCW community. Additionally, Venmo's inclusion of an SAS in a domain often considered private presents a challenging and informative use case. Learning from Venmo complements the prior CSCW literature on SASs to offer a broader understanding of SASs for work in a variety of domains.

2.3 Technology for Money and Personal Finances

Money is typically considered a private matter. Personal finances are rarely discussed, even among family and close friends. When examining people's practices around personal finances, Kaye et al. found a need for technology tools to recognize the sensitive personal nature of finance, as finances are "*above all complicated, heterogeneous, and individually and culturally specific*" [21]. Decisions people make about their personal finances are emotionally charged, and tools in this domain should account for use within the complexity of real life. Perceptions of money also vary widely. Differences are defined not only by demographic factors such as nationality and age but are also rooted in personal, individual circumstances [21,38,41].

These differences in attitudes can translate to perceptions of payment methods and other financial tools. For example, 80-somethings in the UK favor paper cheques to electronic alternatives [39]. They believe this gives them better records, in the form of a cheque stub, and a cheque feels "*much more personal*" than digital payments. Many other groups find digital payment services preferable to cheques or even cash [27]. Peer-to-peer mobile payment (mPayment) apps such as Venmo, SquareCash, and Chase QuickPay can be used for monetary transactions between individuals, and are often viewed as more convenient and flexible than non-digital alternatives [23].

3 DATA COLLECTION AND ANALYSIS

In this study, we sought to learn about people's experiences with the SAS in Venmo. What benefits did they feel they gained from it, and what challenges did it cause for them? Did anyone feel it affected their choice of mPayment apps or how they use them? We therefore conducted two online surveys. The first survey broadly asked people about their use of mPayment apps (e.g., SquareCash, Venmo, PayPal). This survey provides context into how people's use of Venmo was similar or different from their experiences with other mPayment apps, and provides reactions to Venmo's SAS from people who had used similar mPayment apps which do not include an SAS. The second survey was specifically about Venmo use, and comprises the bulk of our findings. To understand practices around Venmo's SAS further, we conducted semi-structured interviews with eight Venmo survey participants and six new participants. Table 1 (next page) describes participant demographics.

The first survey (mobile payments) was aimed at people who use at least one mobile payment app, possibly including (but not limited to) Venmo. Participants responded to mostly open-ended questions about what they prefer, or do not prefer, about each of the mPayment apps they have used. We also showed participants a screenshot of Venmo's SAS and asked them their opinion about encountering an SAS in an mPayment app. Participants gave their impression of Venmo's SAS on a 5-item Likert from "Very negative" to "Very positive" as well as an open-ended text field explaining why they gave that rating. At the end of this survey, participants who qualified for the Venmo-specific survey were invited to participate in that survey as well.

The second, Venmo-specific, survey examined mPayment app behaviors and perceptions of current Venmo users. We wanted these survey respondents to be familiar with the app, so we restricted participation to people who had used Venmo at least 3 times in the previous month. Participants were asked to list 3 adjectives to describe their thoughts on Venmo. While we considered scraping participant feeds, or the public Venmo feed, and coding transaction descriptions, we found these descriptions inscrutable without knowledge of the context and relationships between people involved. We instead asked participants to open the app while they filled out the survey and to describe the last 3 transactions they participated in and the last 3 transactions of their friends.

We recruited survey participants through social media using convenience and snowball sampling. Most participants were recruited through Facebook groups associated with our university, supplemented through the authors' contacts on Facebook and Twitter, as well as subsequent re-posts and shares. For each completed survey, participants were entered in a raffle for one of several $100 Amazon gift cards (one for each 100 participants).

		mPayment Survey (164 people)	Venmo Survey (80 people)	Venmo Interviews (14 people)
Gender (%)	Male	32	41	43
	Female	63	55	57
	No answer	5	4	0
Age (%)	18-21	35	41	43
	22-25	29	33	14
	26-30	16	18	36
	31-35	10	6	0
	36-40	2	1	0
	41+	4	0	7
	No answer	4	0	0

Payment apps used by Mobile Payment Survey participants
Venmo (132), PayPal (56), Square Cash (42), Chase QuickPay (19), Facebook Messenger (16),
Google Pay (13), Splitwise (10), Snapchat (2), Other (17)

Table 1. We collected data from surveys of how people use mPayment apps, about Venmo use, and follow-up interviews.

164 people completed the survey about peer-to-peer payment applications and 80 people completed the Venmo-specific survey. There is some overlap between respondents for the two surveys: 25 respondents to the general survey reported having already taken the Venmo-specific survey, and others were recruited to take the Venmo-specific survey through the general mPayment survey. Our participants were mostly 30 or younger (~80-90% in each study) and skewed slightly female (~55-65%). Venmo was the most common app among mPayment survey participants, though many respondents had used more than one mPayment app over the past three months.

We used an inductive thematic analysis [4] for survey and, subsequently, interview data. The first two authors analyzed the data from the two surveys with a bottom-up approach, starting from survey responses and identifying themes. We iteratively refined these themes through discussion, consolidating related themes. After analyzing the surveys, we still had open questions about people's impressions of Venmo and how they negotiate privacy in Venmo's SAS. We therefore invited 30 of the 80 Venmo survey participants to participate in follow-up interviews, based on their indicating in the survey that they were willing to be contacted for an interview. Eight of these participants accepted. We supplemented with six participants who were active on the authors' Venmo friend feeds.

Interviews were semi-structured, lasting approximately an hour. Questions drew from our initial analysis of the data from the two surveys. For example, we repeated the exercise of having participants open Venmo and describe their last 3 transactions and the last 3 transactions of their friends, asking participants to describe their thought process for writing transaction descriptions. We further asked whether or how they use the SAS more generally, including browsing, liking, and commenting. All interviews were conducted over the phone and were transcribed by an external service. The first author analyzed the interview data through a bottom-up approach, open coding the data and refining codes until themes emerged. Interview participants received $20 Amazon gift cards.

We quote mobile payment survey participants as sXX, Venmo survey participants as vXX, and interview participants as iXX.

3.1   Limitations

Given our convenience sample, we likely over-represent the opinions of students and young professionals. However, this bias aligns with Venmo's popularity among younger adults [24]. Further, our mPayments survey likely over-represents the popularity of Venmo relative to other mPayment apps because of the

preferences of our social networks. This decision supported our goal of understanding impressions of Venmo's SAS and how people use it; our results should not be interpreted as the relative popularity of mPayment apps.

To our knowledge, the bulk of Venmo's user base is from the United States, and our sampling methods over-represent participants from the West Coast of the United States. Care needs to be taken when applying our findings to other cultures, which may respond differently to the inclusion of an SAS in an mPayment app. Privacy norms, for example, vary from culture to culture [28].

To focus on the perceptions of people who frequently use Venmo, for the Venmo survey we screened out potential participants who had fewer than three transactions in the past month. This restriction helped ensure participants were familiar with Venmo's interface and its SAS. People who use Venmo less frequently may have different perspectives on the SAS, such as a greater concern about their privacy.

Our participants represent current users of Venmo and/or other mPayment technologies. While Venmo is an established payment platform—founded in 2009—experiences will change and norms will continue to evolve as new users join the service or competing services, and as designers evolve the features and design of the applications of Venmo and its competitors. Most participants in our study were used to Venmo and its SAS, and not reacting only to its novelty. Though we did not ask participants how long they had been using Venmo for, 57% of Venmo survey respondents had participated in more than 10 transactions in the past three months. They also were not the only people in their friend groups using the application; 68% had over 40 transactions in their feed from the past 10 days.

4   RESULTS: IMPRESSIONS OF THE SAS WITHIN VENMO

Interview participants generally described themselves as neutral or indifferent to Venmo's SAS. They explained that, as long as the feed did not get in the way of the primary purpose (sending and receiving money), they did not give it much thought. However, many of these same interviewees described putting significant effort into curating transaction descriptions, knowing that others would see them, while others expressed concern about maintaining their privacy.

4.1   Overall Impressions and Use of the SAS

Survey participants who had not used Venmo tended to have a negative impression of an SAS in an mPayment app. Of the 32 mPayment survey respondents who had not used Venmo, 88% (28) expressed a "very negative" or "somewhat negative" impression of an SAS within an mPayment app (lower than "neutral" on a 5-point Likert-like scale), though only 22% (7) said that the social aspect pushed them to use other apps over Venmo. In contrast, mPayment survey participants who had used Venmo were less negative: 47% had a negative impression of the SAS, 33% were neutral, and 20% felt positive about the SAS.

106 mPayment survey respondents had used Venmo and at least one other app. When asked about their preferred mobile payment app, only 8 respondents indicated the SAS as a reason they preferred not to use Venmo. For s90, "*the social aspect of Venmo weirds me out. I used it once, and it felt too public for me. I know I can make my activity private, but I can't wrap my head around why people would want their payment activity to other people, even friends, to be publicly visible.*" The other 7 respondents agreed with s90's sentiment, mentioning that they either disliked the public transactions or were not interested in social interaction around their payments.

In contrast, 7 respondents to the mPayment survey listed social aspects as among the reasons they preferred to use Venmo over other apps. They specifically liked "*the ability to use emojis to describe payment purpose*" (s74, 1 other), and "*the ability to see what your contacts are up to*" (s4, 1 other). S163 felt "*it's fun putting little captions for why you did the transaction.*"

I13 sums up her opinion of Venmo's SAS as "icing on the cake... when it's good, it's funny, and I enjoy Venmo more. When it's boring, it's like, 'Eh, whatever.'" She continues, "I feel very neutral about [the SAS] because I generally think that people don't care about other people's lives as much as people think they do." I2 described the social feed as "kind of annoying", but "not something that would deter me" from using Venmo.

10 out of 14 interviewees indicated they never or rarely like or comment on transactions, either their own or those of others in their feed. This was partly due to the random nature of only seeing other people's posts occasionally. I2 said, *"[t]he social feed of friends' activity is the first screen that comes up when users log in to Venmo,"* so *"I inevitably have to look at it at some point."* In other SASs, people more often intentionally look at the feed. I5 does not treat the Venmo feed the same as other SASs: *"I rarely like or comment on [Venmo posts] unless it's just a really random interaction. I don't just scroll through the feed like I would Twitter or something."*

4.2 Concerns, Risks Associated with a Financial SAS

Participants felt an SAS in a personal financial tool was sometimes strange or inappropriate.

4.2.1 Awkwardness of an SAS for Finances

13 out of the 14 interviewees felt the social feed was strange or out of place because it involves sharing something that is normally considered private. Although the main reason people use Venmo is for its utility as a personal finance tool, the social feed is a prominent feature, and the first screen people see when opening the app. I12 thought, *"I see Venmo as a financial app, and not as a social media or networking app. And trying to combine those two, I'm not a fan of."* Others, including i6, explicitly mentioned privacy concerns related to sharing finance information: *"I just don't need people to see I'm paying someone else something or that someone is paying me something."* Additionally, interviewees mentioned feeling uncomfortable about seeing shared details that felt too personal, as in cases of knowing both people involved in a transaction: For i4, seeing that parents had sent money to her friends *"feels like it's something very personal that I shouldn't be seeing."* Without knowing the relationship between the two people involved, users might not be as uncomfortable about seeing these "intimate" details of personal finance.

Many participants compared their experiences with Venmo's SAS to their experiences with other social feeds. Their relationships with the people who appeared in each feed were one common difference. I13 said *"I view Venmo much more as a more intimate relationship [than Facebook] based on who was involved in the situation."* Similarly, i7 described Facebook and its SAS as *"a platform for everyone... like your own personal soapbox."* In contrast, money is *"a pretty sensitive topic... any socialness on top of that, where it's trying to Facebook brag, or talk about your life"* is *"strange, because it's just very personal, so it feels like there's a boundary there."*

4.2.2 Indifference to Seeing Others' Transactions

In about half of the Venmo survey participants' recent transactions, the person paying or being paid was described as someone to whom the respondent felt close. Relationship to people involved in a transaction affects how participants experience the SAS and other social aspects of Venmo.

Participants found it particularly uninteresting when they saw transactions in their friends feed where they did not know both people involved. Moreover, participants felt seeing transactions involving people they knew only vaguely did not add to the experience of Venmo, and often detracted from it. This was particularly the case when Venmo had automatically added their Facebook contacts, especially when many of those contacts were not close friends: *"half of my Facebook friends, I don't even talk to them or I don't need to know what they're doing"* (i4, 11 other interviewees). I4 further felt *"the whole public thing is unnecessary, where you get to see [transactions from] everyone in the whole world."*

Two interview participants appreciated being able to import contacts from Facebook, since *"it's easier to find them and pay them"* (i10). However, this integration between the platforms felt inappropriate and even intrusive for individuals who only use Venmo with a few people regularly. I8 said *"everyone uses Facebook, so that guy that you met down the street yesterday is your Facebook friend"* and continued that *"Facebook is more like a browse-y, 'what are you doing with your life' kind of thing... Venmo is very utility-based... unless someone's going to pay me or I'm going to pay someone, I don't need to be their friend on Venmo."* The majority of our interviewees chose to add Venmo contacts only intentionally and selectively, despite the convenience of importing contacts from Facebook. Others regretted having added contacts from Facebook: *"I hate that I have so many random friends on Venmo, that were pulled in automatically from Facebook, because it's like, 'Oh,*

this guy from college that I talked to my first year, like I don't care what he's doing now,' yet he still shows up. I just want to see the people I care about" (i13).

In addition to the relationship viewers have (or do not have) to posters, the granularity of individual transactions was often seen as too much detail. Most individual Venmo transactions are seen as not important or interesting enough to share, particularly for those who use Venmo only for its personal finance functionality: "*there are some people paying something, why do I care about that?*" (i10). I2 questioned why she would need to know the transactions in her feed, such as that a stranger "*eats kale salad with onions.*"

Most interview participants felt Facebook was a platform for sharing larger stories, such as important life events or other status updates (e.g., getting married, graduation, going on a big trip). Participants felt most Venmo transactions were too small to share as a status update in an SAS. I3 felt that gratuitous sharing – posting trivial or mundane details, such as a shared meal – is less of an annoyance on Venmo than Facebook, since "*I don't really look at the [Venmo] feed that much*" (3 other interviewees agreed). He limits sharing his own transactions to those that are "*kind of unique or funny*" (4 other interviewees expressed similar sentiments).

4.2.3 Awareness of Privacy Settings

When asked about privacy or intrusion, all interviewees indicated that they had considered their privacy in Venmo's SAS and had at least some concerns. Common concerns included having a persistent and visible record of their payments, especially when transaction descriptions were ambiguous and open to interpretation. Others mentioned not wanting to share intimate details such as where and with whom they spent time: "*It's cool to see what my friends are doing, but I don't really want them to see what I'm doing. I don't really like them seeing and commenting when I go somewhere or 'you went to brunch with so-and-so'*" (i12).

However, most Venmo survey respondents and almost all interviewees indicated that the sharing feature (ability to post and view others' posts) did not affect their choice to use Venmo over other payment forms, stressing the app was primarily instrumental. Survey and interview participants concerned about privacy still picked the most convenient payment app. If that payment app was Venmo, they adjusted their sharing settings as necessary. For example, i3 mentioned keeping her default to share publicly and regularly changing her privacy settings for individual transactions she participated in. Three other interviewees had changed their settings so all transactions were private.

Before participating in the interviews, most interviewees who had not changed their settings did not know whether their setting was private or shared. 11 interviewees had the default settings of sharing publicly. Although most interview participants were not aware that this was the default prior to participating in our study, most were not particularly concerned once we discussed it in the interview. For participants who indicated that their personal preference would be for most (or even all) transactions to remain private, these preferences were not strong enough for them to change their sharing setting or look into how to do so. Prior to their interviews, all 4 participants including i2 assumed that all transactions would be private by default rather than publicly shared. I2 commented that she changed her settings during our interview, saying she had previously "*thought about it, but I never actually went through with what I was thinking. I guess I got lazy, because I never had a real need to make something private.*" I7 also "*assumed that [Venmo] would only [show her transactions] to friends from college so I'm probably just going to limit it to friends now.*"

Consistent with prior research on Facebook privacy setting use [20,22], few interview participants seemed particularly concerned that their transactions had been shared with others, often publicly. 88% of Venmo survey respondents indicated indifference towards whether their transactions were shared or private, selecting "neutral" on a 5-point Likert-like scale. This corresponds with few participants reporting actively changing privacy settings for individual transactions or their default sharing settings. When asked about their last 3 transactions, Venmo survey respondents reported that 56% of individual transactions were shared, either with friends or publicly. The other 44% were kept private between the respondent and the other person involved in the transaction. Interviewees further noted that deciding not to share transactions was often less about protecting their own privacy, and more out of consideration for not clogging others'

feeds with mundane posts. I3 was the only interview participant who changed her privacy settings for individual transactions: "*most of the time I post [my transactions] as private or friends only, but if I do post it publicly it's usually 'cause I'm like haha, this is a funny transaction.*"

Participants generally felt posts in Venmo's SAS do not include much meaningful or important information. This contributes to attitudes that sharing transactions is not a major concern. All 14 interviewees described most of their transactions as being for routine, "not very serious" expenses. Participants felt that keeping most posts private was preferable, but not necessary, since their transactions are all "*pretty normal,*" such as "*paying back for utilities, or vacuums, or noodles...I don't think I would be making any transactions that other people would be questioning*" (i2).

4.2.4 Self-Presentation and Future Consequences

Many participants described how their decisions about what to write were based on their experiences viewing others' posts. Their relationship with and knowledge of the people involved in a transaction affects how they perceive a memo. However, they are also aware that strangers may see the same memo and interpret it differently. For example, a friend i2 does not see often anymore "*makes sexual implications. It's just literally three letters like 's-e-x'... if I were to see that on somebody else that I don't know, then it would be some hardcore judgment going on in my head.*"

Participants sometimes felt uncomfortable viewing ambiguous transaction descriptions, such as those using emoji, provocative humor, or sarcasm.

This discomfort led five interviewees to express concern about how others will perceive their own posts, and thus, them. I2 felt that "*I do have to think more about how other people would perceive my transactions... to make sure that I don't do anything stupid... I don't want this record to be something that could be held against me or something that would be a disadvantage for my future self*" (1 other interview participant agreed). These concerns influenced how participants used the description line. Since emoji have greater potential for misinterpretation, and participants tended to think about which emoji to use or whether to include them at all. I2 said, "*if I were to use emoji, I would have to be very clear about what it is.*"

In contrast, several interviewees and many Venmo survey respondents described writing memos that were deliberately vague, cryptic, or even completely unrelated to their transactions, either for their privacy or simply for amusement. For i9, "*even if you post it publicly and you just add a silly comment, it's fine.*" I7 had a similar experience, adding "*a friend of mine paid me two weeks ago, and as she was talking to me, she said, 'I'm just tapping on the first emojis that I see on my phone.' I thought that was kind of funny.*"

9 of the 14 interviewees were not concerned about potential consequences of their Venmo memos. They took comfort, in part, in their sense that it was relatively unlikely that anyone would view their post. They also felt their posts do not contain information that others would find unusual.

4.3   Benefits of Venmo's SAS

Venmo's social awareness stream includes opportunities for teaching, humor, and play. Many of the benefits of Venmo's SAS relate to social translucence, defined by Erickson & Kellogg as the ability to see what others are doing in a system, creating visibility, awareness, and accountability [15]. This view of user activity within the system provides opportunities for social learning.

4.3.1 Social Learning

While some participants commented about others' lack of awareness of what is considered "normal" in Venmo, many others examined the feed to understand normal use. Newcomers to Venmo felt they benefitted from being able to see what kinds of transactions others share and how people describe transactions. 10 interviewees mentioned that before they started using Venmo, friends or others they knew showed them the feed. For many, the visible volume of activity on Venmo—rather than its social features or the content—served as social proof that helped persuade them to download the app. I8 was out with friends and "*they literally just showed me. We were at a restaurant somewhere, and one of my friends just paid one of my friends with Venmo. I asked them about it, and they told me, and it was love at first sight.*"

The social feed also provided an awareness about stylistic conventions in Venmo, including widespread use of emoji: "*when I look through the feed, the people around me, it's almost like 50-50 of people using emoji with just descriptions of it*" (i2). She further described using emoji in terms of social aspects: "*I just wanted to fit in.*" Since emoji figure prominently in the social feed, she thought "*it just seemed like the culture of Venmo was to use emoji instead of actual writing.*"

4.3.2 Reframing of Financial Activity as "Fun" or "Enjoyable"

Venmo's SAS may help users negotiate the otherwise taboo topic of finances while still accomplishing their primary goal of sending and receiving money. Many participants described the feed as "*fun*" or "*entertaining*". I7 finds the feed "*actually pretty cool. I really like seeing what people in my network are naming their transactions. I think it's really cute, all of the emoji.*" I3 also describes using the feed and emoji in a fun way: "*usually it's like if it's somebody I know pretty well I'll use [emoji]. I know they're silly or something.*" Her description of tickets for a Radiohead concert used emoji of "*a radio and then a person's head. That was kind of an example of one where I was just like haha, there's an emoji for this. I know him super well and I felt like being funny.*"

In some cases, this positive sentiment generated by seeing posts with "fun" or clever descriptions appears to remove some of the unpleasantness typically associated with money matters. I5 felt that, "*payments are thought of as serious because finances are a serious thing. Finances are your father's bank or something like that but here it is, it's like social media at the side. Now, [with Venmo], it's a fun way of thinking about money*" (i2 and i4 expressed a similar sentiment). For example, i5 said that searching for emoji to describe a transaction for a friend's birthday was "*just a fun thing to make it fun for the birthday.*"

4.3.3 Descriptions as a Log of Financial Transactions

mPayment apps often serve the same purpose as paper checks or other digital payments, such as credit cards or bank transactions. Similar to the memo line of a check, descriptions in mPayment apps can be used to keep track of personal finances [39]. Descriptions can also ensure both parties involved are clear on the transaction purpose and have a record of payment.

The relationship between the two people involved in the transaction affects whether people write purely descriptive memos. For transactions with people with whom they are not close, participants tried to write specific and unambiguous descriptions, often a simple one or two-word description of the item or reason for exchange. For example, when using Venmo to pay for items found through online marketplaces, I1 "*just put the article that I'm buying*" since "*that's enough to give a context about why I'm spending that money... So if in the future I'm looking back at where I have spent, that will give me enough context, and I don't really need anything more than that to understand.*" In these cases, descriptions are used instrumentally, with utilitarian purpose taking precedence over expressing creativity or impressing others with cleverness. Using Venmo can sometimes even be preferable over cash because of the transaction log it provides. I7 said, "*I wanted to remember who, of those eight new people that I just met, who had paid me and who hadn't. It's easier to know [by looking at transaction descriptions] in Venmo than it would be [tracking] cash in a spreadsheet.*"

Though close friends tended to use transaction descriptions ritualistically, people find their instrumental use necessary in some social situations. I3 said her descriptions "*really depend on the transaction. Sometimes I try to be more creative... A lot of the time if it's just something generic and I don't really care about being creative, then I just put what the literal thing is, like dinner at the name of the place so that they remember what it is... With rent, same sort of thing, I say 'rent for July' or 'rent for June.'*"

Finally, we observed some generational differences in perception and use of the memo line consistent with prior work on age-related preferences in personal finance tools [21,39]. I5, for example, had trouble explaining her use of emoji to older relatives: "*they'll see me type silly payment notes when it's just like, 'This is writing a check. Why are you putting emoji in it?' [To them], it's a serious thing... and we're [not taking it seriously].*"

4.3.4 Creatively Enhancing Shared Experiences

Participants often used the transaction description line with other, more social, goals in mind. Interviewees sometimes spent time on the description text, including hunting for the perfect emoji and making the memo

"clever", for transactions with someone they felt close to. I7 describes "*try[ing] to be clever with what I caption it as... Being clever is something that I like.*" Participants found it enjoyable to come up with clever descriptions and to think about how friends would react to them.

I13 generally found reading others' transaction descriptions meaningless, "*most of the time it's like, 'I don't know any of these people. I don't really care what they're doing'.*" She did, however, appreciate that posts could enhance shared social experiences: "*when it's with a close friend, where we all went to the event together, then it's like, 'Oh, comment is funny,' because I was part of that experience, so I feel an emotional connection to it.*"

Venmo is often used in social situations where both parties are sitting face-to-face, such as when the check arrives after a shared meal. When the transaction occurs in an in-person social situation, the use of Venmo is clear to those involved in the transaction. The required memo line can therefore be used for other purposes, completely independent of the actual transaction. In one such case, i11 says, "*I knew my friend was going to see the transaction, and we both knew what it was for, and there wasn't much thought outside of that. It was just to send some emoji.*" Others might be able to guess, but they would not know for sure unless they were there. When asked to describe the purpose of the last three transactions in their feed, but that they were not involved in, it was not uncommon for Venmo survey participants to write "*I have no idea.*" In these instances, the memo line likely only made sense to the two people involved in the transaction.

Similarly, looking back through his feed, i8 could not recall the purpose of a transaction, even though he had written the description himself. The description he wrote for it "🏓🏓🏓" was "*one hundred percent unrelated*" to the transaction. His description for another transaction, "*bomb stuff*" – paying a friend back for lunch costs – was similarly cryptic and unrelated. He wrote this as a provocative, inside joke with the other person involved. He explained "*I'm sure I just wanted to be put on a list somewhere*", but continued that he would not be particularly concerned about potential negative implications of the description "*unless I get put in a cell somewhere on an island very far away.*"

4.3.5 Awareness and Connectedness

Consistent with prior work on the effects of social media on psychological well-being [12], seeing the social feed helps people feel more connected to people they care about. For i9, the SAS is "*one of the main reasons why I use [Venmo], because I'm connected to all of my kids and also my brothers and sisters and cousins are on it too... I like using Venmo over PayPal because of the social tabs. I think it's cute to see what my kids are doing or chatting about, or what they're planning or whatever.*"

Although participants were careful to say they did not regard the feed as central to their usage or enjoyment of Venmo, some described instances when they appreciated seeing certain posts that would not have been appropriate on other social networking sites such as Facebook. I9 received comments and likes from family members who saw her Venmo post about buying tickets for a tropical vacation.

Users occasionally used Venmo's SAS to confirm hunches about people based on transactions they saw in their friends feed. I5 said, "*if ever I'm really trying to figure out what someone's up to, I stalk them a bit more on Venmo. It's a really fun feed. I have found out that people are dating from checking out that feed.*" She "*was pretty sure this couple of people were dating*", but "*couldn't really tell based on Instagram and Facebook and everything.*" Compared to official status updates posted on Facebook, Venmo transactions can be used to get an "*inside scoop*" (i5). Participants felt slightly guilty about this voyeuristic viewing, but they felt their intentions were relatively benign.

The design of Venmo's SAS also avoided connection breakdowns common to financial matters. I7 mentioned that the limited scope of visibility into others' transactions offered protection from unnecessary squabbles over fairness and small amounts of money. In particular, seeing the dollar amount could detract from the experience of sharing time with friends: "*if we went out to drinks with friends... and then I see the person next to me... only paid $8 because they forgot about the tip, I would be like, 'Hey, that's not cool.'*" Similarly, others mentioned that the inclusion of dollar amounts in transaction posts might lead them to feel judged, or potentially lead them to judge others in unwanted ways, based on what they were spending money on, or how much money they have. For example, i4 felt "*if I'm paying someone a lot of money, let's say $500, people are going to be like, 'Wow, where is the money,' or, 'What's it for?'*"

Engagement with transactions through likes and comments can be used to increase the connectedness and efficacy between mPayment transaction partners. For i2, "liking" a transaction where she received money was a way of encouraging payments by acknowledging them. She used Venmo's 'like' feature with a friend "*who just has a history of not paying me back very often. After I got Venmo, that got a lot better.*" Liking the transaction post was a way of "*acknowledging that I received it and 'Thanks for paying me back so quickly'*" (i2). Similarly, i10 says "*maybe at the time I don't know that person. That person paid me, and I will communicate to them I got the money by liking those.*"

Others display more ritualistic, socially-oriented uses of likes and comments. Whether i13 comments on or likes transactions depends primarily on how close she feels to the other person involved in the transaction. Similarly, 5 participants mentioned that, for the most part, it is only appropriate to like or comment on transactions where they were present for the social situation. Other participants commented on or liked transactions they found "*really funny*" or "*clever*". I3 said "*I'll usually like a status if I thought it was funny*".

5 DISCUSSION

Our study of an SAS in an instrumental application, Venmo, finds uses and experiences that echo prior findings on SASs in social network sites and on social translucence. Much as in other SASs [20,22], many participants were indifferent to their settings for who could see their transactions. Participants aimed to perform in the SAS [43], taking time to craft transaction descriptions to appear as clever. We noticed instances of social learning [1], when people new to Venmo used the SAS to learn about the norms of the space. In a few cases, as shown in other SASs [5,7], incidental encounters with Venmo's SAS even helped people feel more connected to people they care about.

5.1 Blending Instrumental and Ritualistic Use in the SAS

While people used Venmo primarily for instrumental purposes, we found that its SAS blurred the line between individual and ritualistic use for many study participants.

In support of people's instrumental uses, Venmo's description field could be used as a transaction record with businesses or strangers. When using Venmo with weak ties or to meet other goals, such as having a transaction record, people wrote explicit transaction descriptions for clarity or their own record keeping, rather than with the intent of sharing their financial details socially. For example, participants wrote literal descriptions for transactions such as splitting a bill among a large group, or between strangers, such as for items purchased through an online marketplace.

For at least some participants, the playful nature of emoji also can make it less awkward and more fun to request money from or send money to friends. The feed also creates some pressure or reminder to pay one's share in group transactions: when someone sees that others are paying for a cost shared among many people, this can create pressure or serve as a reminder to pay their share.

While these instrumental uses—sending and receiving money—prompted participants to open the application, the feed also offered some limited support for many of the uses associated with SASs in ritualistic applications. In transactions where the instrumental goals were less essential—e.g., someone wanted to pay a friend, but did not feel a need for a transaction record—they could repurpose the description field to make jokes with the transaction recipient or to perform for others.

Once Venmo was open, participants sometimes perused the feed. Through even vague transaction histories, this often gave them some insights into what friends were doing or who was spending time with whom. Many participants, however, described more inhibitions to commenting on these insights than they did on platforms such as Facebook; we are unsure how much of this is a norm of the platform versus a consequence of the more instrumental use of the application or the sensitive domain of personal finance.

5.2 Social Learning: Discovery or Building Norms?

The social learning in Venmo resembled the social learning described in ritualistically-used applications (e.g., Facebook) more than it resembled the social learning we would expect in other instrumentally-used applications.

In other instrumental applications, the feed often presents users with opportunities for relatively immediate action. For example, seeing a friend's listening on Spotify might motivate someone to immediately click and listen to a new artist or just listen along. Seeing biking or running routes on Strava might prompt someone to discover and plan to try a new route. This sort of discovery is not impossible in Venmo—someone could see a transaction description (e.g., "*Brunch at Norm's Eatery*", "*Coachella Tickets*") and be inspired to take action—but it was not described by our participants. Designs that prompt people to leave more specific transaction descriptions or to open the app more often could possibly change this.

On Venmo, in contrast, participants described learning more about norms related to using Venmo or its SAS. For what sorts of transactions might they use Venmo? How should they use the description field? These uses mirror the social learning described among Facebook users [6]. Even when participants felt that the Venmo feed prompted people to take action, it seemed to be more about communicating an injunctive or descriptive norm (e.g., that you should pay someone for something or that other friends have reimbursed them) than about inspiring a novel action.

Because of its focus on shared transactions, participants did not describe this sense of accountability or creation of financial norms as extending to their other transactions. While SASs in other applications can be used for commitment and accountability—e.g., regularly checking in code to a project on GitHub [10], or logging healthy food on MyFitnessPal or Instagram [8]—Venmo's feed does not create a similar opportunity.

Finally, we emphasize the importance of the feed in communicating the application's credibility to users. People are often wary of connecting their financial information to a new application. Opening the application and seeing many transactions among trusted friends and colleagues helped establish the application's credibility for some participants. Even when people were reluctant to provide their contact or Facebook information to the app (a step that can be risky in itself), their friends could show them the feed on their phone to similarly build that trust.

Although social feeds can be used in unexpected ways and offer opportunities for learning, the decision to include an SAS in any application hinges on the application's purpose and the granularity of information to be shared. Participation in the feed should be optional when sharing has the potential to be compromising or embarrassing, as can often be the case in instrumental apps. Venmo and Spotify navigate this balance by allowing people to use the instrumental features (e.g., making transactions, listening to music) while still keeping their transactions or listening habits private. Moreover, they allow people to selectively make a given transaction or a period of listening public or private, giving people—even if rarely used—flexibility.

5.3 Design Implications and Future Extensions

Our results extend the CSCW community's understanding of how SASs may be used in applications and the experiences they create for their users. Consequently, these results describe design implications around privacy and tone. They also raise possibilities for extensions of the SAS to other domains.

First, when including an SAS in an instrumental app, designers should consider what content adds to the SAS and what is unnecessary or might even hinder use. In Venmo, for example, transaction amounts being only visible to the people involved contributes to the experience of using or viewing it. If the amounts were shared, participants may have been more concerned about this feed of financial data.

Designers should further consider what tone they want to set in their app, and how the tone augments the functional purpose or detracts from it. Suggesting emoji in place of a text transaction description promoted fun, playful descriptions, removing some tension around transferring money. In Venmo, the ambiguity of emoji also adds another layer of privacy to transactions.

However, this playful aspect can also be a barrier to adoption by those who want the SAS to help them accomplish their instrumental goals. For example, people who view transaction descriptions as functioning like the memo line of a check may be turned off by the inclusion of features trying to promote ritualistic practices, like auto-suggesting emoji. Even a few participants who reported enjoying the use of emoji on some occasions also described minor annoyance that Venmo's auto-complete made it difficult to correct for unintended or undesired emoji.

Finally, designers of SASs in instrumental apps should consider who they hope will participate in the SAS. Venmo highlights a tension between functionality and enjoyment when including an SAS in a utilitarian, financially-focused app. Venmo's ability to easily import phone contacts and Facebook friends reduces barriers to completing a transaction and helps make the application feel more alive or used when someone first connects their contacts to it. However, this populates a user's SAS on Venmo with weak ties [17], "*so it's not as meaningful a feed*" (i5). People prefer versions of the SAS in social networking sites like Facebook, which filter to the activity of strong ties and bigger life events [16,33]. People may prefer similar filtering in a functional SAS.

The specific design choices for the SAS in Venmo or other mPayment apps are unlikely to transfer directly to other domains or even to other financial applications. We believe, however, that the benefits and risks, and our participants' experiences with Venmo, can still provide valuable design guidance to others. For example, feeds in navigation or coupon apps may help make tedious activities more fun. They may also offer opportunities for social learning—e.g., someone might infer that a deal is a good value, and believe the site is reputable, if they see that many trusted friends have purchased it. Inclusion of an SAS may also remove some stigma or seriousness typically associated with certain domains, like finance.

6 CONCLUSION

Much as social awareness streams can enrich applications that people use socially or ritualistically, they can also enrich applications meant to help people complete tasks, even in a sensitive domain such as personal finance. As Venmo and the ways people use its SAS demonstrate, these benefits can include helping people complete their tasks, through social learning and reduced stigma. The SAS also can blur the line between the task and more social uses, as the feed presents opportunities for keeping up with friends or having a playful conversation.

In Venmo, design choices that expose activity while hiding some details or leaving them ambiguous—e.g., excluding transaction amounts, encouraging the use of emoji that are open to interpretation—help make the SAS acceptable or even appealing in a domain often considered private or sensitive. The flexibility of transaction descriptions that appear in the Venmo feed also mean that people can adapt their use to meet their needs in a variety of situations.

The results of our study complement and extend the CSCW community's understanding of the use of social awareness streams in ritualistically used applications with insights into how they can support instrumental applications. We find that SASs offer benefits in the instrumental application Venmo, many of which are similar—even surprisingly so—to those in ritualistically used applications. Venmo's SAS succeeds due to a balance of visibility of activity and ambiguity of details, plus the use of emoji to make that ambiguity interesting and playful. The achievement of these benefits offers an inspiring use case for designers considering use of an SAS, and extends the CSCW community's understanding of social features.

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