



# From #RelationshipGoals to #Heartbreak – We use Instagram differently in various romantic relationship statuses

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## Abstract

Nowadays Social Media plays a key role in the formation, maintenance and breaking up of romantic relationships. Instagram, one of the most popular platforms among young adults, was examined by many researchers from the viewpoints of e.g. relationship goals, satisfaction and conflicts. These studies concentrate on the impact of online activities on relationships. With this current research our aim is to widen this perspective: we attempt to investigate how relational factors influence the use of the popular social network site. In Study 1 a qualitative approach was introduced ( $N = 18$ ), in Study 2 participants ( $N = 238$ ) reported in an online survey about their Instagram activity in various relationship statuses as well as relationship satisfaction and jealousy. We found that changes in the relationship status can be detected through the modification of Instagram usage. The characteristics of Instagram activity are significantly different at the beginning and at the end of a relationship. Furthermore, using cluster analysis we found that jealousy and relationship satisfaction are core predictors of post frequency, the amount of time spent with browsing and the importance of Instagram. In sum, the patterns of Instagram activity are strongly influenced by romantic relationship status.

**Keywords** Social media · Romantic relationships · Break-up · Jealousy · Relationship satisfaction

## Introduction

In 2019 the well-known celebrity couple Irina Shayk and Bradley Cooper split up i. a. because of the actor's affair with Lady Gaga. After the break-up the model almost immediately went on a luxurious getaway. During this trip Shayk shared with her 13.5 million Instagram followers a very sophisticated yet enviable picture of herself (standing by a waterfall in swimsuits) disambiguating that she is more than over her ex. The post was liked by over 700.000 users including Lady Gaga's ex. This short excursion is a great exemplification of the key role of social media played in romantic relationships nowadays. Moreover, it also shows clearly that social media activity depends largely on current romantic relationship

status as well. Since online spaces have become inseparable parts of the young generation's daily routine in the late 1990's, several studies investigated the influence of these platforms on romantic relationships, focusing mostly on the impact of online activity on relationships. In our study, we examined the opposite: how does romantic relationship status affect the characteristics of social media use, e. g. how online activity differs depending on such relational circumstances like a beginning of a new relationship or a break-up.

## Romantic Relationships in the Digital Context

Being in a good romantic relationship is one of the fundamental components of life which is for most people often more important than any other areas (work, material goods, etc.) of life (Campbell et al. 1976). In consequence of this romantic relationships are conceptualized and studied from numerous aspects, e. g. from an evolutionary (Buss and Schmitt 1993), communicational (Altman and Taylor 1973) and economical perspective (Thibaut and Kelley 1959), but many investigated commitment processes (Rusbult 1983) or the impact of attachment style on romantic relationships (Hazan and Shaver 1987; Constant et al. 2018). Some theories suggest that different stages can be distinguished in romantic relationships from

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courtship to the break-up (Knapp 1978). According to Carter and McGoldrick (1999) as the relationship phases alternate, different needs come into prominence. At the beginning of a new relationship couples often experience strong feelings: during this stage partners frequently make major efforts to please or impress the other person. As the relationship progresses, couples tend to focus their energies on establishing themselves, e. g. moving in together, getting married, etc. Eventually, if a relationship comes to an end the former couple usually seeks to create a favourable narrative of the events, reframes the common memories and tends to reconfigure themselves (Rollie and Duck 2006). Online platforms have a defining role in every stage – formation, maintenance and the breaking up – of a romantic relationship nowadays, especially among adolescents and young adults. Specialized in romantic interests, plenty of dating sites provide the virtual context for starting a relationship (Valkenburg and Peter 2007). As for the maintenance of a romantic relationship, social media platforms offer the opportunity of easy and fast communication (Tong et al. 2008; Tufekci 2008a; Ledbetter 2014; Jang et al. 2015), moreover they provide the possibility for couples to share their happiness with the acquaintances (Utz and Beukeboom 2011). Finally, SNSs can maintain the information flow even after the end of a relationship. If the ex-partners decide to remain “friends” on social media, they can still monitor the other’s activity even they not communicate offline nor online directly (Fox et al. 2014). In either of the above-mentioned relationship phases conflicts from social media use may often arise. Previous studies investigated thoroughly how online presence affect romantic relationships and in general we can say that SNSs predominantly appear in a negative context. More specifically conflicts generated by social media use are based on the feelings of jealousy. Facebook, for instance often evokes the feeling of jealousy: certain information without the proper context can lead to jealousy even in a satisfying and completely trustful relationship (Muise et al. 2009). Quite similar results were found in the case of Snapchat, a newer social media platform, enabling non-persistent information and a smaller network to contact with. Although, it provides a more private opportunity to communicate than Facebook, Snapchat allows to its users to track with whom their acquaintances communicate which can easily generate tension between romantic partners (Utz et al. 2015). Instagram also has an important but not very favourable role in romantic relationships. Two recent studies suggest that frequent selfie posting is typically associated with negative relationship outcomes. This form of self-promotion often generate jealousy because of the too positive reactions of the followers (Halpern et al. 2017; Ridgway and Clayton 2016). However, if users tend to make their relationship more visible on social media is not necessarily the certain sign of harmony: Emery et al. (2014) found that this behaviour was typical among those participants who felt insecure about their

partners’ feelings. In addition, Orosz et al. (2015) found that declared relationship status leads to not just the experience of elevated love but more jealousy as well. Therefore, it is not surprising at all that a recent study found that the importance of online communication typically decreases in long-term relationships (Sanchez et al. 2017).

### The Importance of Instagram Use among Young Adults

Until the early 2010’s Facebook was practically the only platform where the young generation featured romantic relationship related information about themselves regularly. However, since plenty of new SNS sites were developed, as well as because of the elderly (e.g. the parents and grandparents of the original users) started to use Facebook actively (McCarthy 2018) this hegemony swayed among adolescents and young adults. The most remarkable rival is Instagram which had half a billion users worldwide who shared 95 million posts per day in 2017 (Dumas et al. 2017). The most represented age group on the site is the 18 to 29-year-olds who find it much more entertaining and relevant than Facebook or Twitter (Pittman 2015; Alhabash and Ma 2017). Communicating with more visual elements (pictures, short videos, GIFs, etc.) than any other SNS site, Instagram offers a very clear and easy way for sharing information, e. g. events of everyday life (Vaterlaus et al. 2016) which can be an important component in its popularity among the members of young generation. But it seems, that the primary motivation to use Instagram is to maintain relationships and get information about other people. In 2016, a study revealed that the main reasons for Instagram use were “*Surveillance/Knowledge about others*”, “*Documentation*”, “*Coolness*” and “*Creativity*” (Sheldon and Bryant 2016). Out of the four factors, “*Surveillance*” was the most dominant motivation, covering activities such as following and liking other users’ posts. Therefore, if a couple decides to become “official” in the virtual space nowadays, they are more likely to announce it with a dyadic picture on Instagram (maybe accompanied with a common hashtag) rather than a relationship status-update on Facebook. Furthermore, as it is very common among active SNS users tend to share such personal aspects of their lives that were considered to be private a few years ago (Liu 2007; Tufekci 2008a), they will feature details about their relationship mostly on Instagram.

### Connections between Instagram Use and Romantic Relationship Status

Just like on all social media platforms Instagram users have absolute control over their digital presence (Boyd and Ellison 2008; Quinn et al. 2016; Tufekci 2008b) therefore they can easily communicate the positive aspects of their identity:

success, physical attractiveness, creativity (Deeb-Swihart et al. 2017; Hu et al. 2014) which can be relevant regarding romantic relationship related information too. Current needs play an important role in that what kind of impressions are desired to make. Uses and Gratification Theory (Katz et al. 1973) which has been applied on several SNSs, including some Instagram studies investigating use motives (e.g. Cheung 2014), holds that we use media in a way that best fulfil our individual needs. Meaning that if a specific type of media tends to satisfy us more, we will choose to engage more often in that media. As different life situations evoke different individual needs, the characteristics of social media use (e. g. the type of content users share, the amount of time users spend on Instagram, etc.) can also change along with different romantic relationship statuses. In addition, changes in the characteristics of online identity presentation are plausible as well. Several previous studies emphasized the importance of identity presentation in adolescents' and young adults' social media presence (Back et al. 2010; Good 2012; Joinson 2008; Tufekci 2008a; Zhao et al. 2008). Donath (2007) argues that based on Signalling Theory (a concept in evolutionary biology examining communication between individuals) we can interpret acts of identity presentation on social media as signals. Signals can be defined as guidelines to understand the behaviour of other people originally under offline circumstances (Zahavi 1975) but online activities are full of signalling too: e. g. how we introduce ourselves, how many and what kind of pictures we share, who we follow, etc. (Donath 2010). Moreover, it is also relevant in this case that how users present if they have someone special in their life or how this change, if the relationship deteriorates or ends. Users typically tend to change their online behaviour after a break-up. Previous studies found that users can be not just up to date regarding the ex-partner's everyday life through social media, but they also can address them indirect messages, e. g. posts which have a hidden meaning interpretable by only the previous partner (Marwick and Boyd 2014; LeFebvre et al. 2015; Ouytsel et al. 2016). Ergo, monitoring of the ex-partner's online activity and indirect communication towards social media platforms are important (new) functions of social media after a break-up which implies notable changes in the characteristics of SNS use. However, less is known about what kind of impact has a new romantic relationship on social media use or how relationship satisfaction or jealousy influence on online presence, more specifically on Instagram use.

## Aims

Previous studies focused on the impact of online activity on relationships. Our aim with this current research is to reverse this direction of effect. We attempted to investigate how relational factors, like a new relationship or a break-up leave traces in the virtual space and how it influences the

characteristics of the online activity. As it seems to be more adequate to the 18–29 age group than other SNSs (Pittman 2015; Alhabash and Ma 2017) we presume that Instagram is the platform where young adults report about their private life, therefore it is the proper online space to examine. Based on Signalling Theory (Donath 2007; Donath 2010) and Uses and Gratifications Theory (Katz et al. 1973) we assume that Instagram has a different function in users' personal life depending on relationship status or events. In addition, we presume that the form and content of the featured information are going to change in parallel with relational changes. The research questions were as follows. RQ1: How changes in relationship status are manifested on Instagram and how do these life events influence the characteristics of Instagram activity? RQ2: Does Instagram have a different function in users' personal life depending on their relationship status?

## Study 1

### Method

In the first phase of the research a qualitative approach was introduced. We decided to choose qualitative methodology at the beginning of our work for two reasons. On the one hand we aimed to acquire a deeper insight to the psychological functions that Instagram fulfils in romantic relationships and explore processes that previous studies based on big data analysis may have skimmed over. On the other hand, we aimed to be sure that Instagram users belonging to this age group can interpret the processes and phenomena we interested in. In other words, they have personal experiences to share regarding this topic. Therefore, semi-structured interview was chosen as an adequate method (Vaterlaus and Higginbotham 2011). The 10 questions of the interview focused on the characteristics of Instagram use in connection with changes in romantic relationship status. Based on Alhabash and Ma (2017) we formulated questions on the role of Instagram in participants' everyday life and on that how does online activity influence their offline routines (e. g. *Have you ever did something or attended to something just because you could share it on Instagram?*). Previous studies suggest that romantic relationship status is often declared on social media on several ways (Emery et al. 2014; Orosz et al. 2015; Sanchez et al. 2017) therefore we formulated questions on this phenomenon (e. g. *How did the latest change in your romantic relationship status affect your Instagram activity?; If a stranger would look at your Instagram feed whether he/she notice the change?*). Furthermore, in parallel with LeFebvre et al. (2015) and Ouytsel et al. (2016) we formulated questions regarding indirect communication with the ex-partner through Instagram after a break-up (e. g. *Have you ever wanted to send an indirect message to your partner or ex-partner this way?*).

## Sample and Data Collection

Eighteen active Instagram users were involved as participants, 13 of them were women and 5 men, with an average age of 21.5 years (from 20 to 25 years). All of them were Hungarian. Though the only requirement for participation in the study was that the person is, or was, an active Instagram user, all participants were active Instagram users at the time when the interviews were conducted. The interviews lasted 30 to 50 min, on average. They were conducted face-to-face: the conversations were recorded and transcribed by six undergraduate students who had previous experience in interview taking. The students earned credits for their work. The study was approved by the Institutional Review Board at Eötvös Loránd University. The procedure of data collection took place according to the Ethical Code of Hungarian Psychological Association.

## Data Analyses

We decided to use Thematic Analysis (TA) and inductive coding practice as the method of the text analysis as it helps to organize the subjective experiences of the participants to clear categories. Since we planned to conduct a quantitative study based on the results of Study 1 it was essential to choose such method to facilitate to compile an online questionnaire. Interviews were transcribed by the same person who took the interview. In parallel with Braun and Clarke (2006) coders familiarized with the all the transcripts individually by noting their impressions and reflexions on the texts. Coding took place in the group of interviewers led by the first author. First, we generated initial codes highlighting segments of the text (usually a sentence or a paragraph added up a meaning unit) that described a specific phenomenon. In doubtful cases we added new codes with specific definitions to ensure the consistency of the used codes. According to Miles and Huberman (1994) 80% agreement between coders is sufficient thus we discussed each code until we reached this agreement value. In parallel with Strauss (1987) we considered frequency of the weight of each code therefore we searched for themes among codes that appeared at least in the one third of the interviews. After developing twelve sub-themes four main themes were emerged: (1) The role of Instagram in participants' everyday life, (2) Impact of a new relationship on Instagram activity, (3) Impact of a break-up on Instagram activity, (4) Impact of Instagram activity on "offline" routines. Each main theme was defined from three sub-themes as it is illustrated on Fig. 1.

## Results

### The Role of Instagram in Participants' Everyday Life

We revealed that according to participants Instagram is more suitable to give an insight to their private life than Facebook or

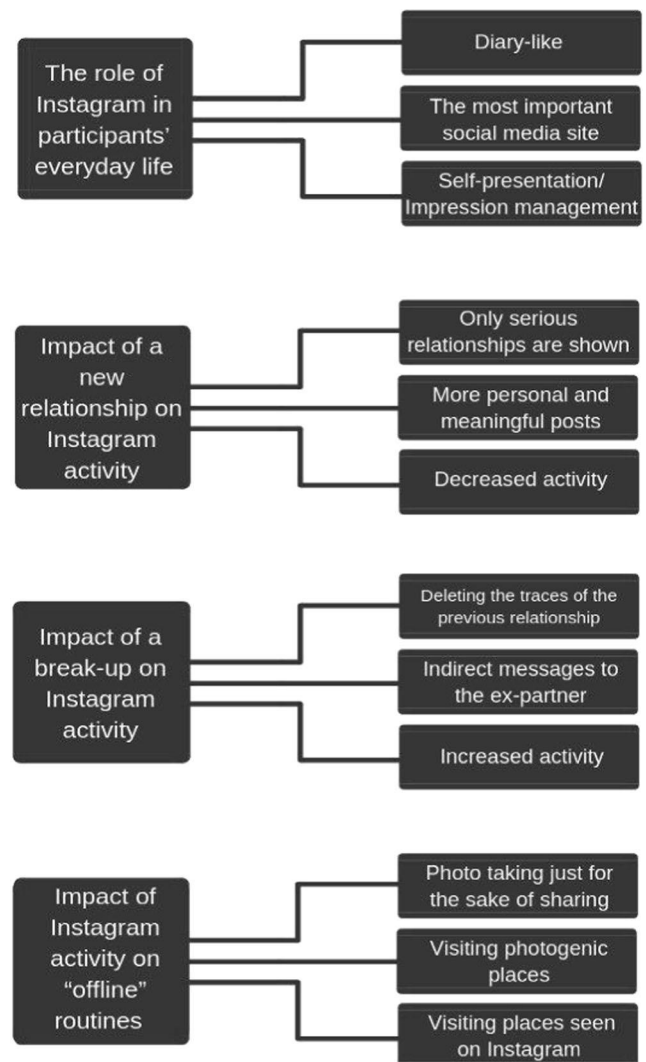


Fig. 1 The four main themes and sub-themes

any other SNS site. Participants expressed that they found Instagram more honest and genuine. Therefore, inactivity can be observed on other social media sites: Instagram became the only platform where they report about their everyday life. As a 21-year-old female participant expressed: “*I prefer Instagram instead of Facebook (...) I rather share things here than other social media sites. So, we can say that this is the primary field where I let people to take a look inside to my life.*”

### Impact of a New Relationship on Instagram Activity

Changes in participants' relationship status can be detected through the modification of their activity. In the beginning of a new relationship lessened activity is typical although participants tend to feature more meaningful and personal posts. As a 20-year-old male participant said: “*My pictures are more personal since then... I started to focus on people so the thing [the relationship] has an impact on my pictures in a way, I'm*

*dealing with people much more since we get together. I was interested in spaces rather than capture someone before."*

### Impact of a Break-Up on Instagram Activity

After a break-up Instagram typically transforms to an online space where users can observe their ex-partners' activity. They also can address indirect messages to them through the featured posts (e. g. with pictures which are meaningful only for the previous partner) thus the frequency of posting usually increases. Moreover, featured pictures not only contain indirect messages to the ex but the new partner of the ex as well. As a 25-year-old female participant pointed out: "I started to use Instagram after a break-up. The guy cheated on me he had someone else in parallel with me. I used Instagram as a project to build up myself again because I was pretty upset. I wanted to feel that I have my own cute and presentable things. The guy was very active on Instagram as well as the other girl. I was like 'I can do this too!'" Furthermore, due to the indirect messages incorporated to the shared content the themes of the pictures transform as well. As a 23-year-old participant expressed: "I do not usually take a selfie but once [after a break-up] I felt very bad and the lights were pretty and I did it because, I wanted him to see I am getting likes and comments, and I am looking good." After a break-up, most of the participants tended to delete every picture in connection with the previous relationship. Only a few of them reported that it is quite impolite to erase the common memories.

### Impact of Instagram Activity on "Offline" Routines

Even though the impact of Instagram use on everyday habits is not closely linked to current topic, it is remarkable how online presence can form offline habits. As several participants mentioned, in many cases they perform acts just for the sake of sharing e. g. photo taking or participation in different programmes. A 23-year-old female participant said: "*For example once I considered go to a hiking tour because I thought I could share beautiful pictures.*" Another participant a 22-year-old female pointed out: "*If I see a good place on Instagram where others went or someone I follow visited that place and 'Wow it looks so cool we should go there too!' then I usually visit that place.*" Furthermore, the influence of Instagram on daily routines seems to be stronger after a break-up. A few participants mentioned that they often visit places connected to their previous relationship for the sake of sharing pictures addressed to the ex.

### Discussion of Study 1

In Study 1 we attempted to investigate, how changes in romantic relationship status shapes the characteristics of Instagram activity and how this popular social media platform

fulfils different psychological functions in users' personal life depending on their relationship status. The results of our first study underlined that Instagram has a privileged role among participants in comparison to other social media sites. Interviewees pointed out that they share more personal information on this platform than on any other SNSs. These results are completely in parallel with previous studies emphasizing the importance of Instagram in young adults' everyday routines (Deeb-Swihart et al. 2017; Hu et al. 2014; Pittman 2015). The text analysis clearly showed that the participants' Instagram use reflects relational factors. Despite social media sites provide the opportunity for couples to share their happiness with their friends (Utz and Beukeboom 2011) we found that in the beginning of a new relationship participants tend to neglect Instagram therefore, activity typically decreases. As couples typically focus on each other exclusively during courtship and usually engaged in intensive self-disclosure (Altman and Taylor 1973; Carter and McGoldrick 1999) it is not surprising that the importance of social media activity becomes secondary. Moreover, the uploaded content is also different as it was before the new relationship. Different tendencies can be observed in the case of break-ups. Although participants tend to delete every picture in connection with the ex-partner featured posts are often addressed to them. This phenomenon can be considered as a manifestation of *social steganography*: a posting strategy frequently performed by adolescents and young adults. They often share updates or pictures with a hidden reference to their lives accordingly the real meaning of the featured content is not evident for every acquaintance, but it is for a selected few, e. g. the closest friends or the (previous) romantic partner (Marwick and Boyd 2014). Our findings are analogous with previous studies (Fox et al. 2014; LeFebvre et al. 2015; Ouytsel et al. 2016), that is Instagram clearly have a different function in users' personal life depending on their relationship status. Finally, the qualitative research pointed out that Instagram has a definite impact on offline routines and habits. According to de Vries (2014) monitoring other users' activity in social media can contribute to the changing of offline habits (e. g. daily routines). However, our findings suggest that participants change their offline habits for the sake of sharing: in other words, they tend to engage in those events and activities which they can share on Instagram.

## Study 2

### Aims

As we found in Study 1 participants tend to use Instagram differently in distinct relationship statuses. In parallel with Creswell et al. (2003) and Venkatesh et al. (2013) we followed the sequential mixed methodology and conducted a

quantitative data collection in Study 2 to increase the reliability and credibility of our previous findings. Qualitative data analysis provided us in-depth knowledge and contributed to the exploration of the topic, yet on a limited sample. Therefore, we aimed to investigate the topic with quantitative approach as the results might be inferred to a wider population. Unitized and categorized qualitative data helped us to develop several items to the online survey which we could use besides the standardized questionnaires. Moreover, there were questions that emerged from the results of Study 1 could not be answered with qualitative methods but needed to be statistically tested on a larger sample (e. g. comparing the change in Instagram use between different relationship statuses or identifying groups among Instagram users based on their relationship satisfaction). Therefore, in Study 2 we attempted to investigate with a quantitative approach whether Instagram activity is significantly different at the beginning and at the end of a relationship. Previous studies emphasize the importance of jealousy elicited by social media use (Halpern et al. 2017; Muise et al. 2009; Ridgway and Clayton 2016; Utz et al. 2015). It is also shown that insecurity in the partner's feelings can lead to overrepresenting the relationship on SNSs (Emery et al. 2014). Based on these results we aimed to examine the role of relationship satisfaction and jealousy in the characteristics of Instagram activity. Moreover, we aimed to compare the characteristics of Instagram activity in two relationship stages: at the beginning of a new relationship and after a break-up. The research was conducted under the approval of the Institutional Review Board of Eötvös Loránd University. The procedure of data collection took place according to the Ethical Code of Hungarian Psychological Association.

We formulated the following hypotheses:

H1: At the beginning of a romantic relationship, characteristics of Instagram activity is significantly different than after a break-up.

H2: Participants with different constellations of relationship satisfaction and jealousy are showing different patterns of Instagram activity (e. g. post frequency, the amount of time spent with browsing or the general importance of Instagram).

## Method

### Participants and Procedure

Respondents completed an online questionnaire that was open for 3 weeks in April 2018. They were recruited by convenience sampling and snowball method as we posted the link of the questionnaire on Facebook. Participants were required to be over 18, and to be active Instagram users at the time or previously. Our sample consisted of 238 participants, with a

mean age of 23 ( $M = 23.15$ ,  $SD = 4.59$ ); 5.5% completed primary school, 55.9% secondary school, and 38.7% graduated from higher education; 82.4% of respondents were women. 67.6% was in a relationship at the time of the data collection: 45.3% of them went out with their partners, 41% lived together, 8.1% got engaged, and 5.6% were married to their partners. Regarding Instagram usage, only 18.9% spent less than 10 min on this online platform daily, 28.2% between 10 and 30 min, and 26.5% between 30 and 60 min. 18.5% used Instagram between 1 and 2 h on a daily basis, 6.3% between 2 and 3 h, and only 1.7% used Instagram more than 3 h per day. We used the available Hungarian translations of the scales where they were available or created single item measures if there were no validated scales to measure the constructs.

### Measures

The questionnaire contained 2 sections, altogether 46 items. First, we asked participants about the characteristics of their Instagram use.

**Post Frequency** In connection with the frequency of posts, respondents could choose from the following options: “*less than once a month*”; “*once a month*”; “*once a week*”; “*once a day*”; “*many times a day*”.

**Daily Time Spent on Instagram** Respondents could indicate the amount of time they spent daily on Instagram with the following options: “*less than 10 minutes*”; “*10 to 30 minutes*”; “*from 30 to 60 minutes*”; “*1–2 h*”; “*2–3 h*”; “*more than 3 hours*”.

**General Importance of Instagram** We measured the importance of Instagram in respondents' lives on a scale ranging from 1 (*Unimportant*) to 5 (*Very important*).

**The Importance of Presenting the Relationship on Instagram** Participants indicated the importance of presenting their relationship on Instagram with a scale from 1 (*It is not important at all*) to 5 (*Very important*).

The next part of the questionnaire revolved around the participants' relationships, specifically we asked about changes in their relationship status, relationship satisfaction and jealousy.

**Presenting New Relationship of Break-Up on Instagram** We asked participants how they present their new romantic relationship on Instagram (e. g. with dyadic pictures, common hashtags, etc.). They were also asked how they present the end of a relationship and the pain related to the break-up on Instagram. Respondents indicated if they *unfollowed their previous partner*; *blocked their previous partner*; *followed*

them after break-up or unfollowed them but looked at their profile from time to time.

**Changes in Instagram activity after relationship status change.** Participants also rated whether there were any changes in *the amount of selfies; the amount of pictures with friends; the amount of party pictures; the frequency of posting pictures; the amount of given likes; the amount of given comments; the amount of time spent on Instagram* in the beginning of a new relationship. They responded on a scale ranging from 1 (*decreased*) to 5 (*increased*). Three meant that there was no change in the activity. We also asked participants to evaluate the change after break-up in *the amount of selfies; the amount of pictures with friends; the amount of party pictures; the frequency of posting pictures; the amount of given likes; the amount of given comments; the amount of time spent on Instagram*. They answered again with a scale from 1 (*decreased*) to 5 (*increased*). Three indicated that there was no change in the activity.

**Relationship Satisfaction** Relationship satisfaction was measured with the Relationship Assessment Scale (RAS; Hendrick 1988; translated to Hungarian by Martos et al. 2014), with seven items such as: “How well does your partner meet your needs?” Participants responded with a scale ranging from 1 (*Low satisfaction*) to 5 (*High satisfaction*). The reliability of the scale was very good ( $\alpha = .91$ ).

**Jealousy** Jealousy was measured with 4 questions: “How much would you bother if your partner liked the image of a person of the same sex with you?”; “How much would you bother if your partner commented on a picture of a person of the same sex with you?”; “How much would you bother if your partner wrote a direct message to a person of the same sex with you?”; “How much would you bother if your partner shares content (e.g., image, Instastory) from a person of the same sex with you?” Participants responded on a scale ranging from 1 (*It would not bother me at all*) to 4 (*It would bother me*). The reliability of the 4-item index was very good ( $\alpha = .91$ ). We conducted an exploratory factor analysis using principal axis factoring, and the items constituted one factor with an explained variance of 73.31% with factor loadings between .76–.95 (KMO = .82).

## Results

**Descriptive Statistics** One hundred twelve respondents (47.1%) displayed their relationships by sharing dyadic pictures, 15 (6.3%) in their bios, and 6 (2.5%) used hashtags expressing that they are in a relationship. 105 (44.1%) answered that they do not display the relationship at all. Figure 2 shows how respondents displayed the end of their relationships on Instagram. 129 of them answered that their online behaviour changed after the break-up. Almost half of

them (47%) reported that they deleted the dyadic pictures, whilst 22% deleted all images that reminded them of the previous relationship. Less than a tenth (9%) of the participants responded that they did not delete but archived the dyadic pictures, and 9% answered that they deleted everything from their bio related to the relationship. Also 9% reported that they did not delete dyadic pictures after a break-up, and 4% archived every image that reminded them of the ended relationship. We excluded 109 participants who claimed that they did not have an Instagram-relevant break-up yet.

117 (90.69%) respondents answered that they did not show the pain at all. Only 5 (2.1%) uploaded sad quotes, 4 (1.7%) used darker colours in their pictures, 2 (.8%) used sad emoticons, and only 1 (.4%) admitted doing all the previous behaviours. Figure 3 shows how participants followed their partners after breakup on Instagram.

Pearson correlations, the means and standard deviations of relationship satisfaction, jealousy, posting frequency, the daily time spent on Instagram, the general importance of Instagram, and the importance of presenting the relationship on Instagram are shown in Table 1. Relationship satisfaction and jealousy did not correlate with each other significantly. Those, who were more satisfied with their relationship also felt that it was important for them to present their relationship on Instagram. Nevertheless, jealousy significantly predicted the daily amount of time spent on Instagram, the general importance of Instagram, and the importance of presenting one’s relationship on this platform. Neither relationship satisfaction, nor jealousy are associated with posting frequency significantly.

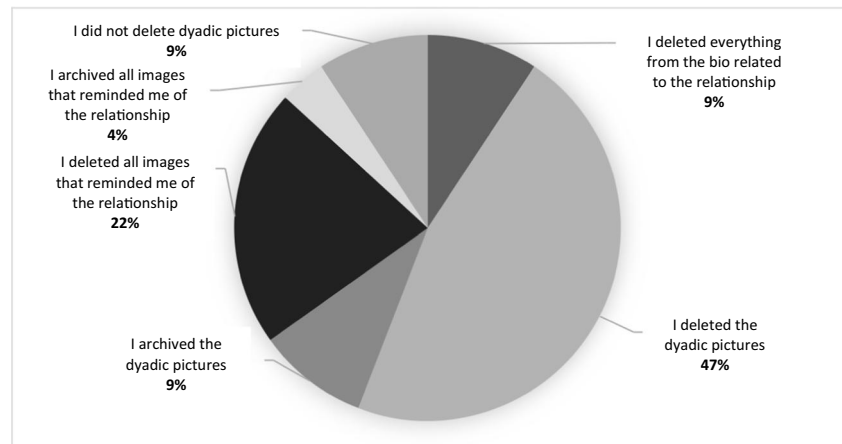
**Data Analysis** The aim of the statistical analyses is twofold: first, we examined changes in Instagram-related activity depending on romantic relationship status, and used paired-samples t-tests to compare the change between the Instagram usage at the onset of the relationship and after the breakup. Second, we aimed to identify groups based on relationship satisfaction and jealousy and conducted hierarchical cluster analysis in order to find similar subgroups of respondents. Then we compared these groups regarding their Instagram activity using multivariate analysis of variance.

Changes in Instagram-activity depending on romantic relationship status.

To measure the change between the Instagram-related activity at the onset of the relationship and after the breakup, we conducted paired-samples t-tests. The means, standard deviations, and the results of t tests with effect sizes are seen in Table 2.

Results showed that at the onset of the relationship the self-reported online activity slightly decreased, for example respondents uploaded less party pictures. Nonetheless, self-reported online activity increased after break-up: people uploaded significantly more selfies, pictures with friends,

**Fig. 2** Display of break-up on Instagram ( $N = 129$ )



party pictures, and the general frequency of posting pictures increased. Respondents also reported that they spent significantly more time on Instagram and gave more likes and commented more often after breakup compared to the onset of the relationship.

### Identifying Groups Based on Relationship Satisfaction and Jealousy

We conducted hierarchical cluster analysis in order to find patterns among respondents, and relationship satisfaction and jealousy were used as clustering variables. We applied agglomerative cluster analysis (Ward Jr. 1963) and Ward's method with Squared Euclidean Distance in order to ensure that the algorithm merges those clusters that results in minimum growth in total within-cluster variance after merging.

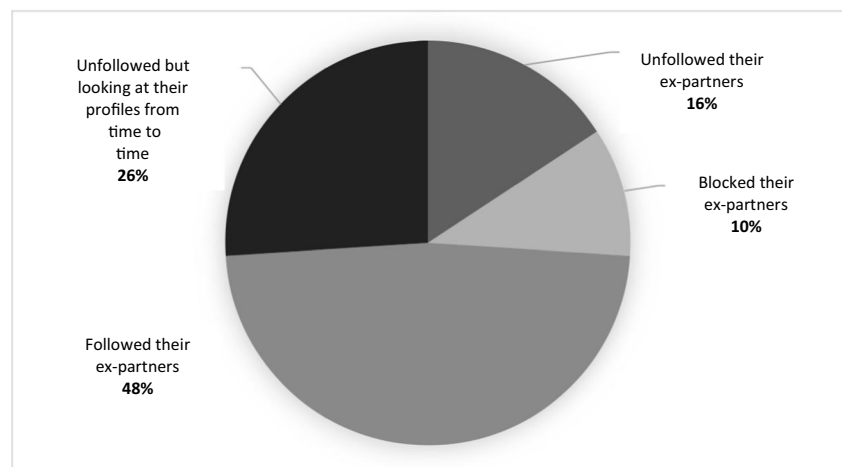
Agglomeration schedule was used to determine the ideal cluster number. The total variance within data was 474.00, therefore we tried to identify the elbow point where the within variance was still smaller than the between variance, so as to ensure that the observations in one particular cluster are closer to each other than to the observations in another cluster, and to

get a parsimonious solution with small number of homogeneous clusters. We found the elbow point at 3 clusters (within variance: 185.406 and between variance: 288.594), indicating homogenous clusters. After this point, within variance grew enormously, resulting in big heterogeneity in clusters. The 2-cluster solution (within variance: 307.863 and between variance: 166.137) had high heterogeneity, therefore it was not acceptable. We also validated the 3-cluster solution: the measure of relative improvement (MORI) shows that our cluster structure and the related quality coefficient measures (e.g., explained variance, homogeneity, or Silhouette-coefficient) are significantly better than what is obtained from random permutations of the clustering variables (Vargha et al. 2016). Consequently, the 3-cluster solution was used in subsequent analyses.

Non-hierarchical K-means cluster method was applied in order to verify the result of the hierarchical clustering (Hair et al. 1998). We created Z scores to ease the interpretability of our variables, and the means became zero. The final cluster centers are presented in Table 3.

Variance analysis indicated that relationship satisfaction ( $F(2, 235) = 216.76, p < .001$ ) and jealousy ( $F(2, 235) =$

**Fig. 3** Following the partner after breakup on Instagram ( $N = 127$ )





**Table 1** Correlation matrix between main measures, means, and standard deviations

|   | 1      | 2      | 3      | 4      | 5    | 6 | <i>M</i> | <i>SD</i> |
|---|--------|--------|--------|--------|------|---|----------|-----------|
| 1. Relationship satisfaction                                  | 1      |        |        |        |      |   | 4.23     | .84       |
| 2. Jealousy   | .08    | 1      |        |        |      |   | 2.29     | .91       |
| 3. Posting frequency  | -.12   | .12    | 1      |        |      |   | 2.12     | .97       |
| 4. Daily time spent on Instagram                              | .07    | .30*** | .15*   | 1      |      |   | 2.70     | 1.24      |
| 5. General importance of Instagram                            | -.07   | .25*** | .23*** | .60*** | 1    |   | 2.31     | 1.06      |
| 6. The importance of presenting the relationship on Instagram | .29*** | .19**  | .05    | .21*** | .15* | 1 | 2.55     | 1.33      |

|   | 1      | 2      | 3      | 4      | 5    | 6 | <i>M</i> | <i>SD</i> |
|---|--------|--------|--------|--------|------|---|----------|-----------|
| 1. Relationship satisfaction                                  | 1      |        |        |        |      |   | 4.23     | .84       |
| 2. Jealousy   | .08    | 1      |        |        |      |   | 2.29     | .91       |
| 3. Posting frequency  | -.12   | .12    | 1      |        |      |   | 2.12     | .97       |
| 4. Daily time spent on Instagram                              | .07    | .30*** | .15*   | 1      |      |   | 2.70     | 1.24      |
| 5. General importance of Instagram                            | -.07   | .25*** | .23*** | .60*** | 1    |   | 2.31     | 1.06      |
| 6. The importance of presenting the relationship on Instagram | .29*** | .19**  | .05    | .21*** | .15* | 1 | 2.55     | 1.33      |

Relationship satisfaction, posting frequency, general importance of Instagram, and the importance of presenting the relationship on Instagram were measured with a scale ranging from 1 to 5. Jealousy was measured with a 4-point Likert scale, and daily time spent on Instagram with a scale from 1 to 6

245.40,  $p < .001$ ) played equally important part in creating the clusters.

**Core Predictors of Instagram Activity**

We conducted multivariate analysis of variance (MANOVA) to reveal the differences between the clusters regarding posting frequency, the daily time spent on Instagram, the general

importance of Instagram, and the importance of presenting the relationship on Instagram. There was a statistically significant difference in these measures based on cluster membership,  $F(8, 464) = 5.08, p < .001$ ; Wilk’s  $\Lambda = .846$ , partial  $\eta^2 = .080$ . In the next paragraphs, we list only the significant differences between the clusters. Results of the analysis suggest that clusters significantly differed in posting frequency ( $F(2, 235) = 5.13; p < .007$ ; partial  $\eta^2 = .042$ ). Tukey post

**Table 2** Means, standard deviations, and the results of paired-samples t tests with effect sizes

|                                   | At the onset |           | After breakup |           | <i>t</i> (128) | <i>p</i> | <i>Cohen’s d</i> |
|-----------------------------------|--------------|-----------|---------------|-----------|----------------|----------|------------------|
|                                   | <i>M</i>     | <i>SD</i> | <i>M</i>      | <i>SD</i> |                |          |                  |
| Amount of selfies                 | 2.78         | .88       | 3.26          | .95       | -4.00          | .000     | .52              |
| Amount of pictures with friends   | 2.98         | .72       | 3.56          | .78       | -6.03          | .000     | .77              |
| Amount of party pictures          | 2.64         | .87       | 3.46          | .75       | -7.64          | .000     | 1.0              |
| Frequency of posting pictures     | 2.96         | .82       | 3.29          | .84       | -2.92          | .004     | .40              |
| Amount of given likes             | 2.90         | .84       | 3.36          | .76       | -4.12          | .000     | .57              |
| Amount of given comments          | 2.86         | .60       | 3.10          | .57       | -3.00          | .003     | .41              |
| Amount of time spent on Instagram | 2.91         | .96       | 3.53          | .78       | -5.59          | .000     | .71              |
|                                   | <i>M</i>     | <i>SD</i> | <i>M</i>      | <i>SD</i> | <i>t</i> (128) | <i>p</i> | <i>Cohen’s d</i> |
| Amount of selfies                 | 2.78         | .88       | 3.26          | .95       | -4.00          | .000     | .52              |
| Amount of pictures with friends   | 2.98         | .72       | 3.56          | .78       | -6.03          | .000     | .77              |
| Amount of party pictures          | 2.64         | .87       | 3.46          | .75       | -7.64          | .000     | 1.0              |
| Frequency of posting pictures     | 2.96         | .82       | 3.29          | .84       | -2.92          | .004     | .40              |
| Amount of given likes             | 2.90         | .84       | 3.36          | .76       | -4.12          | .000     | .57              |
| Amount of given comments          | 2.86         | .60       | 3.10          | .57       | -3.00          | .003     | .41              |
| Amount of time spent on Instagram | 2.91         | .96       | 3.53          | .78       | -5.59          | .000     | .71              |

Participants responded with a scale ranging from 1 (*Decreased*) to 5 (*Increased*). 3 meant that there was no change in the activity

**Table 3** Final cluster centers (K-means cluster analysis)

|                                     | Cluster 1 | Cluster 2 | Cluster 3 |
|-------------------------------------|-----------|-----------|-----------|
| Relationship satisfaction (Z score) | .35       | -1.87     | .34       |
| Jealousy (Z score)                  | 1.00      | -.28      | -.77      |

The standardized mean is 0

hoc test supports that respondents of the second cluster ( $M = 2.43$ ,  $SD = 1.17$ ) posted significantly more than their peers in the third cluster ( $M = 1.92$ ,  $SD = .91$ ,  $p < .014$ ). Clusters were also different in the amount of time their members used Instagram ( $F(2, 235) = 8.22$ ;  $p < .000$ ; partial  $\eta^2 = .065$ ). Participants of the first cluster spent significantly more time on Instagram ( $M = 3.09$ ,  $SD = 1.27$ ) than people in the third cluster ( $M = 2.40$ ,  $SD = 1.17$ ,  $p < .000$ ). Cluster membership also predicted the general importance of Instagram ( $F(2, 235) = 6.12$ ;  $p < .003$ ; partial  $\eta^2 = .050$ ). Instagram was significantly more important for people in the first cluster ( $M = 2.56$ ,  $SD = 1.11$ ), than for those in the third cluster ( $M = 2.06$ ,  $SD = .99$ ,  $p < .002$ ). There were significant differences in the importance of presenting one's relationship on Instagram ( $F(2, 235) = 8.42$ ;  $p < .000$ ; partial  $\eta^2 = .067$ ). Members of the first cluster thought that it was more important to present their relationships on Instagram ( $M = 2.90$ ,  $SD = 1.32$ ), than people in the second cluster ( $M = 1.89$ ,  $SD = 1.05$ ,  $p < .000$ ).

The cluster profiles are illustrated in Table 4.

The first cluster ( $N = 93$ ) represented those who were above average jealous, but were on average satisfied with their relationships, therefore we call them "the jealous". People in this cluster used Instagram the most, and they rated it as more important than members of other clusters. They also thought that presenting their relationship on Instagram is very important. In the second cluster ( $N = 37$ ) respondents were highly dissatisfied with their relationship, but were on average jealous, so they were "the dissatisfied". They posted the most often but were the least likely to think that it was important to present their relationship on Instagram. The third cluster ( $N = 108$ ) comprised those who were lower in jealousy, but were on average satisfied with their relationship, so we give them the "average" name. They used Instagram and posted the least frequently and were the least likely to think that Instagram is important.

## Discussion of Study 2

We hypothesized (H1) that there is a significant difference in the characteristics of Instagram usage at the beginning and at the end of a romantic relationship. In accordance with our hypothesis, results have shown that Instagram activity differs depending on relationship status: participants use Instagram differently when they are in different relationship stages. At the beginning of a new relationship online presence of participants decreased as they uploaded less pictures about themselves or their social life. As Uses and Gratifications Theory states we use media to satisfy our current needs (Katz et al. 1973). It is clear that at the beginning of a new relationship there is much less needs to be fulfilled by social media as couples usually experience intensive feelings and tend to concentrate exclusively on each other (Carter and McGoldrick 1999). In contrast, when ending a relationship, the greater importance of Instagram can be observed, e. g. since online activity can contribute to the reconfiguration of the self (Rollie and Duck 2006). Previous studies also found that social media provides the easiest way not only to monitor the activity of the ex-partner (Ouytsel et al. 2016) but to send implicit messages to the former partner (LeFebvre et al. 2015). According to Signalling Theory online communication helps users to maintain a certain (evidently positive) image of themselves (Donath 2010). Our results, in parallel with previous studies have shown that participants tend to follow their ex-partners after the break-up, moreover increased post frequency implies that Instagram functions as an indirect communication channel with the previous partner. In addition, a break-up literally means more time to spend with several activities resulting increased engagement to social media as well. We also aimed to reveal (H2) the core predictors of post frequency and the importance of Instagram. Our findings suggest that jealousy and relationship satisfaction both have an important role in this regard. Previous studies found that social media activity often elicits jealousy (Muise et al. 2009; Ridgway and Clayton 2016; Halpern et al. 2017) however our results showed that jealousy and relationship dissatisfaction can lead to higher engagement on social media. These are in parallel with the results of Emery et al. (2014) who found that individuals who felt insecure about their partners' feelings tended to make their

**Table 4** Cluster profiles for the three clusters

|  | Cluster 1<br>(The jealous) | Cluster 2<br>(The dissatisfied) | Cluster 3<br>(The average) |
|--|----------------------------|---------------------------------|----------------------------|
| Posting frequency  | 2.24                       | 2.43                            | 1.92                       |
| Daily time spent on Instagram                              | 3.09                       | 2.62                            | 2.40                       |
| General importance of Instagram                            | 2.56                       | 2.41                            | 2.06                       |
| The importance of presenting the relationship on Instagram | 2.90                       | 1.89                            | 2.48                       |

relationship more visible on social media. Finally, it is clear that Instagram is less relevant for those participants who are satisfied with their relationship. This is in parallel with the results of Sanchez et al. (2017) who found that the importance of online communication typically decreases in stable relationships.

## General Discussion

With this current study we aimed to explore an underrepresented yet important question, namely the influence of romantic relationship status on the characteristics of Instagram activity. To give a comprehensive and complex explanation of the topic we applied multimethod approach: a qualitative and a quantitative study was conducted as well. In line with previous studies (Pittman 2015) our findings point out that Instagram is the platform which fits the needs of young adults' well. It became the social media site where they tend to report about their everyday life regularly. As previous studies showed (Deeb-Swihart et al. 2017; Hu et al. 2014; Sheldon and Bryant 2016) one of the core functions of Instagram use is identity presentation. In addition, we found that this includes the showing of the actual relationship as well. The coinciding results of Study 1 and Study 2 are in parallel with previous literature on romantic relationships. As different relationship phases have their specific needs (Altman and Taylor 1973; Knapp 1978; Carter and McGoldrick 1999; Rollie and Duck 2006) thus Instagram activity also shows different patterns in different relationship stages. As qualitative and quantitative results both revealed that a new relationship diverts attention from online spaces thus lessened Instagram activity is typical. At the end of a relationship in contrast, social media becomes more important. After a break-up, Instagram gains new functions especially as it transforms to an indirect communication channel with the ex-partner. It is also found that satisfaction or dissatisfaction with the relationship can predict the characteristics of activity and the importance of Instagram as well. In sum, our results emphasize that relational factors have a remarkable influence on social media activity.

## Limitations and Future Directions

Even though multimethod approach gave us a brighter overview on the effects of offline changes on online activity patterns there are still numerous future directions in this regard. First, as many other studies on social media, our research applied a retrospective focus resulting that participants had to recall on their Instagram activity changes months, even years back. In order to collect more reliable data closest in time to the online activities, a diary study would be appropriate. It is also clear that Instagram activity differs at the beginning of a new relationship and after a break-up which makes it necessary to investigate these states more specifically.

Therefore, separate studies are needed to get a deeper insight into the impact of each romantic relationship status on Instagram activity. Additionally, it would be also useful to divide participants by their actual relationship status in the future. In a following study, consideration of the influence of personality factors in the characteristics of romantic relationship related to Instagram usage would be relevant, e. g. narcissism, self-esteem or Big Five factors could play an important role in a relationship's social media appearance. The impact of cultural context on the presentation of romantic relationships in social media is also worth investigating in the future. We conducted both studies in Hungary meaning that we worked with a non-USA sample which supports the underrepresented European region in social media research, however a European-US comparison would be elucidative regarding this case. Finally, it is also important to mention the practical implications of our findings. As our results hold notable information about the psychological implications of social media use, they can be utilized by counsellors and couple therapists in therapeutic work. Our findings also can be incorporated into interventions and campaigns on conscious social media use to reduce the negative effects of online activities. Although there are still plenty of questions waiting to be explored, our study can be defined as a step to a clearer understanding of the background of our digital presence.

**Availability of Data and Material** The authors are willing to share their data, analytics methods, and study materials with other researchers. The material will be available upon request.

**Authors' Contributions** Lili Fejes-Vékássy contributed the research idea, the general design of the studies and the preparation of the manuscript. Adrienn Ujhelyi helped with the design of the studies and contributed to the preparation of the manuscript. Laura Faragó helped with the data analysis, the preparation of figures and tables and the results section of the manuscript.

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## Compliance with Ethical Standards

**Conflicts of Interest/Competing Interests** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Ethics Declarations** This study was carried out in accordance with the recommendations of Ethical Guidelines and Ethical Committee of *anonymous* University with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Ethical Committee of Eötvös Loránd University.

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