

Persona Development in the Public Domain? Challenges to tackle

RONTELTAP Amber^{a*}; BUKMAN Andrea^a; DE JONGE Martha^b and ROSCAM ABBING Erik^c

^a University of Applied Sciences Utrecht

^b Trimbos Institute, Utrecht

^c Livework, Rotterdam

* Corresponding author e-mail: amber.ronteltap@hu.nl

doi: 10.21606/dma.2018.392

How to create personas to improve designs for behaviour change strategies in the public domain? Three recent cases illustrate lessons learnt and challenges encountered during persona development in the public domain. Personas were helpful to gain insight into diversity within a target group, to create empathy for its members, and to have a shared understanding when communicating about them. The main challenges encountered were 1) capturing complex behaviour with personas, as the behaviours involved were variable over time, the (legislative) environment in motion, and the target groups diverse; 2) finding the right balance between intuitive vs. evidence-based decision-making, a process we coined “taking a responsible leap of faith”; and 3) transferring personas to third parties, as free sharing of insights and tools is common in the public domain. Validation plays an important role in personas’ transferability. We call for all involved researchers to share experiences with using the persona methodology in the public domain, in order to tackle the challenges, and to create a more standardised way of developing personas.

personas; public domain; behaviour change; methodology

1 Introduction

Designers have known for a long time that products and services should match users’ perceptions, motivations, and circumstances to increase satisfaction and effectiveness. One particular tool used by designers for this purpose are personas (Cooper, 1999). Personas are fictitious archetypes of users, each reflecting a distinct pattern in goals, attitudes and behaviours, based on empirical research among potential users. According to Goodwin (2009), personas can help in the design of almost anything that is used or experienced by humans. They can be used for multiple goals, for example in designing products, in communicating with stakeholders, and in marketing products. Personas help build empathy and user focus in situations where the user’s context is complex, and



This work is licensed under a Creative Commons Attribution-NonCommercial-Share Alike 4.0 International License.

<https://creativecommons.org/licenses/by-nc-sa/4.0/>

where service providers have some distance to the end user, for reasons of organisational complexity or hierarchy.

However, despite its widespread use and potential value, the method of personas has also received firm criticism from design researchers. A major point of critique is the lack of possibilities to check personas' validity (Chapman & Milham, 2006), reason for several researchers to publish their efforts to validate personas (Subrahmaniyan, Higginbotham & Bisantz, 2017; Vincent & Blandford, 2014). Although these studies are valuable additions to literature, we are nowhere near a gold standard how to validate personas. Another point of critique is articulated by Matthews and colleagues (2012), who warn not to replace actual contact with the target group by personas alone. Moreover, they urge not to include too many personifying details to personas, as this can be misleading or distracting (Matthews, Judge & Whittaker, 2012). Clearly, personas are not mature yet in terms of methodological rigour.

Exactly this rigour in methodology is important when working in the public domain (including areas as health promotion and health care, sustainability, and safety). As strategies aimed at behaviour change in the public domain are often financed through taxes, all expenses need to be justified, and scientific evidence is a common and accepted way to do this. So, the immaturity of personas in terms of rigour seems to stand in the way of applying them in the public domain; both researchers and budget owners prefer more thoroughly validated tools to arrive at project results. At the same time, there is an urgent need in the public domain to better target strategies aimed at behaviour change to specific groups, to which personas may contribute.

The disappointing effects of traditional one-size-fits-all strategies on behavioural change in the public domain have led to a call to make strategies fit in with users' actual experiences, or in other words, to tailor them to the receiver (Noar, 2006). Tailoring refers to the development of a strategy intended to reach one specific person, based on characteristics of that person that are related to the target behaviour (Kreuter & Skinner, 2000). Whereas tailoring is focused on reaching one person specifically, targeting is focused on reaching a defined subgroup (Kreuter & Skinner, 2000). Taking into account the unique characteristics of people in the target group greatly increases relevance, and thereby effectiveness, of strategies aimed at behaviour change (Noar, Benac & Harris, 2007; Whatnall, Patterson, Ashton & Hutchesson, 2018). So far, efforts to target behaviour change strategies have often been limited to stratification on sociodemographic factors like gender and age. Differences in meaningful behavioural determinants like motivation are usually not accounted for.

Can personas be helpful in identifying the relevant distinguishing characteristics of the target group? Recently, Vosbergen and colleagues (2015) explored the use of personas to tailor education messages for coronary heart disease patients. Although the results were cautiously positive, the researchers conclude that the distinctiveness of their personas was too low, and that the amount of information needed to describe their personas was too burdensome for respondents. Moreover, to have personas fully integrated into actual patient education strategies, they would need to be scientifically valid.

Despite these difficulties in applying personas in behaviour change strategies in the public domain, we believe there is a promising match between the two. Designers often express a desire to boost innovation in the public domain¹. Professionals in the public domain, at the same time, are eager to increase the effectiveness of their behaviour change strategies, and are stimulated to achieve this through multidisciplinary approaches. Therefore, the research question this paper aims to answer is: how can personas add to designs for behaviour change strategies in the public domain? We explored this in three recent cases, in which a multidisciplinary team developed personas aimed to eventually guide behaviour change strategies.

¹ E.g., see CLICK NL; the Dutch national Research Agenda for the Creative Industry.

2 Cases

2.1 Case 1: Preventing smartphone use by young adolescents during bike riding ('SMARTPHONE CASE')

Project team: Communication researchers from an applied university in cooperation with commercial service designers.

Commissioned by: A Dutch regional government organisation.

Project goal: To investigate potential strategies to prevent young adolescents from using their smartphones while riding a bike.

Problem description: Phone use during bike riding increases the risk of an accident (Goldenbeld, Houtenbos & Ehlers, 2010). In this project, we investigated strategies to prevent this risky behaviour targeting children in the last year of primary school (aged 11-12y). What can we do in order to prevent smartphone use while riding a bike among these young adolescents?

Purpose of personas: The purpose of the personas was to aid prioritising different intervention strategy options with a shared picture of the users in mind. The personas were solely meant to inspire strategy development within the project team. They were not intended for use outside the project team.

Data collection: The data collection involved two activities: 1) literature study, and 2) field research. Data were collected med-2016. From literature, we gained insight into smartphone use (in general as well as during bicycling), and cognitive development of children in the target group. The main aim of the fieldwork was to put ourselves in the shoes of the target group. Literature study and field work took place simultaneously to enable them to inspire each other and help to determine focus. The field work started with an open exploration among the target group by observing and questioning young adolescents who passed by in the street on their bikes (n=18). Next, both a primary and a secondary school class were visited to immerse ourselves in the (social) environment of the target group. Finally, 8 children were interviewed at their own kitchen table together with at least one of their parents, to deepen our insights into the role of the smartphone in children's lives, and the consequences this has for their behaviour on the bicycle. Topics in the interview were: social environment, smartphone use (both in general and during bike riding), house rules related to smartphone use, perceived bicycle skills, and the transition from primary to secondary school. Before the interviews, all children and parents individually filled in a sensitizer (i.e. a visually attractive assignment, aimed to provoke and facilitate respondent reactions) (see Figure 1). The interviews were audio recorded and transcribed verbatim.

Persona development: Data were coded by grouping similar quotes in order to capture reoccurring themes. These themes were used to determine scales on which members of the target group could vary (e.g. frequency of smartphone use while bicycling, risk perception, (house) rules related to smartphone use). These scales formed the basis for the personas. In a working session with all project members, we mapped different personas on these scales. The team decided on the number and characteristics of personas based on both the empirical data and intuition. After creating five personas, all extremes of the scales appeared to be covered. Then, citations from all transcribed interviews were assigned to the different personas in order to check whether the five created personas covered these citations. This was indeed the case, which led us to definitely decide on the five personas. In the final step, we expanded the personas with more details and illustrations.

Persona validation: As the personas will only be used for inspirational purposes within the project team, validation is considered irrelevant.

Outcomes: Five personas (Bukman et al., 2016) that helped to guide further decision making in the project. First, by jointly selecting one of the personas to prioritise further actions, or in other words, collectively agree on which part of the target group to focus on first. Second, by helping to imagine

how different behaviour change strategies would influence each of the five identified parts of the target group. In a follow-up project, the aim is to further design intervention strategies, building on the personas.

Reflection on persona development process: The number of respondents, particularly the number of interviewees, was small, which may have led to a disproportionate dependence on intuition, as compared to actual data. In a relatively short time, five detailed personas were developed. The target group is highly dynamic, that is, they are subject to drastic social and personal changes due to puberty. As the personas are static and the risky behaviour is (mostly) in the future, current personas might give limited clues for developing strategies for preventive purposes. We therefore feel the need for ‘dynamic personas’.

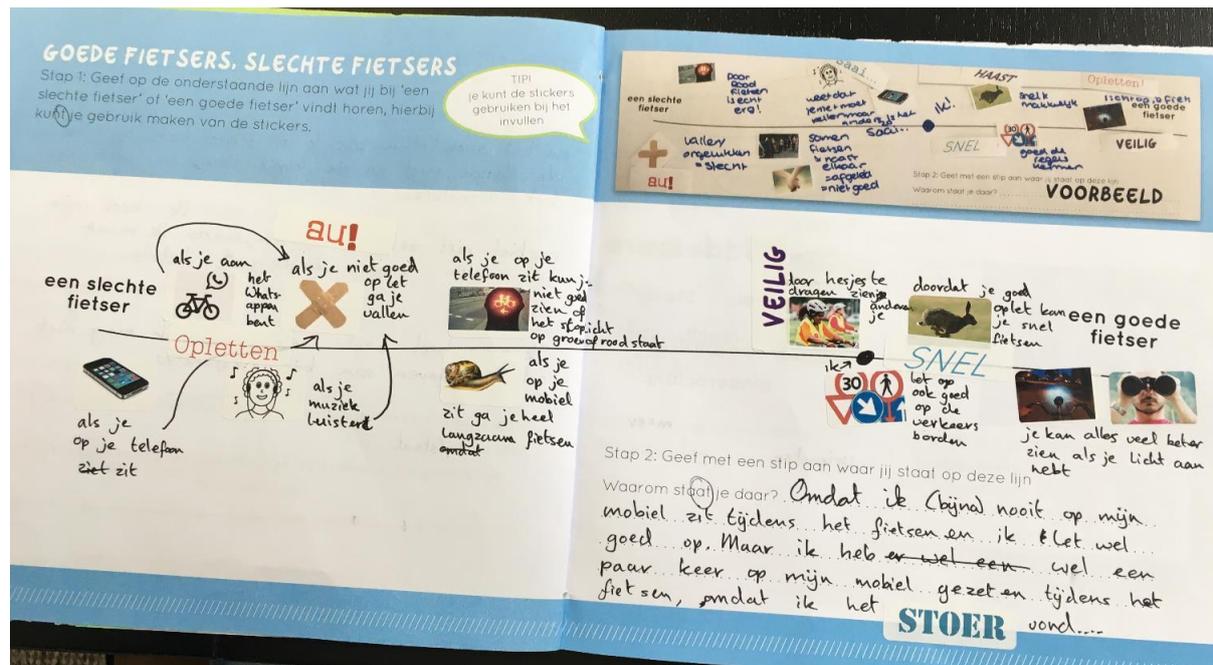


Figure 1 A page from the sensitizer booklet used in the smartphone case. The illustration shows the child's perception of a bad ('een slechte fietser') and a good cyclist ('een goede fietser'). Source: Case 1.

2.2 Case 2: Targeting young adults' use of alcohol and drugs ('SUBSTANCE USE CASE')

Project team: Researchers from a Dutch institute specialised in mental health and addiction in cooperation with communication researchers from both a university and an applied university.

Commissioned by: The Dutch national government.

Project goal: To define distinct subgroups of users and non-users of alcohol and drugs, and develop personas that can assist in (re)designing targeted prevention strategies. The project focused on young adults (aged 18-25y).

Problem description: Intervention strategies aimed at the prevention of alcohol and drug use generally distinguish two groups: users and non-users. However, within these groups large differences exist in e.g. motivation, lifestyle, social environment and experiences with drugs. Insight into the different subgroups is necessary to target prevention strategies more specifically. Which subgroups can be distinguished, and how can they be captured by personas?

Purpose of personas: The personas were developed to guide professionals in designing targeted intervention strategies for and communication with young people considering drug use. Therefore, the personas developed in this project needed to be suitable to be transferred outside the project team to professionals designing or implementing intervention strategies.

Data collection: This project followed two stages: 1) literature study, and 2) interviews. The literature study took place in 2016; the interviews were conducted early 2017. The literature study focused on previously identified subgroups, and the determinants responsible for distinguishing these subgroups. The identified subgroups were used as a basis to recruit participants for the second stage: the interviews. In the interviews (n=43), we dug deeper into young (18-25y) people's perceptions and experiences regarding alcohol and drug use. The interviews were conducted at public places (e.g. their school or a bar) and followed a semi-structured interview protocol, based on determinants of behaviour (Fishbein et al., 2001) and topics identified during the literature study. Participants were asked about their drug use and their favourite drug. The interview concentrated on both participants' favourite drug and their most often used drug. When a participant had not used alcohol and/or drugs in the past 12 months, the interview focused on determinants of not using alcohol and/or drugs. The following topics were discussed: personal and sociodemographic characteristics, current behaviour (alcohol and drug use, lifestyle, nightlife), first experience with substance use, determinants of current substance use, and determinants of and intentions for quitting or reducing substance use. The interviews were audio recorded and transcribed verbatim.

Persona development: Transcribed data were coded with the specialised coding software MAXQDA. The topics from the interview guide were used as themes for coding. For developing personas from the data, the steps of Goodwin (2009) were followed: (1) Identify behavioural and demographic variables for each role; (2) Map interviews to variables; (3) Identify and explain potential patterns; (4) Capture patterns and define goals; (5) Clarify distinctions and add detail.

Persona validation: The personas will be validated by qualitative research among professionals working with the target group. Additionally, quantitative research among the target group will be done to determine to what extent the different personas represent the target group.

Outcomes: Fourteen draft personas. The next step is to validate the personas.

Reflection on persona development process: The large amount of data made the persona development a timely process, but provided a very solid empirical basis for the personas. In line with their evidence-based way of working, the researchers were hesitant to make intuition-based decisions. The persona development process in this case was further complicated by the diversity of the population of interest. All young people aged 18-25y were targeted, for use of any type of drug. Consequently, a large number of interviews were carried out to capture the diversity and a large amount of data was collected.

2.3 Case 3: Supporting nature conservation ('NATURE CASE')

Project team: Commercial service designers in cooperation with representatives of the commissioner, and commercial quantitative researchers.

Commissioned by: A Dutch nature conservation society (NCS).

Project goal: To provide the NCS with insights in the drivers of people's behaviour related to enjoying, experiencing and protecting nature, so that the NCS can develop value propositions (i.e. sets of core customer benefits) for target group segments based on these drivers.

Problem description: It is the NCS' mission to protect Dutch nature. The NCS needs a substantial body of members and supporters backing their activities. Therefore, the NCS has to continuously reach new people with meaningful value propositions, to persuade people to become active (paying) members rather than 'passive' consumers of nature. What are the main drivers of different subgroups to actively support NCS?

Purpose of personas: The purpose of the NCS personas was threefold: 1) to create a shared understanding between internal stakeholders; 2) to create a clear picture of how the NCS target group is segmented in terms of behavioural drivers; and 3) to better design value propositions that persuade these segments to become active members of the society.

Data collection: This project's data collection encompassed two stages, carried out early 2017: 1) desk research, and 2) field research. In stage 1, previous research related to the (potential) target groups of the NCS was collected and summarised, including other segmentation studies (based on socio-demographic), customer satisfaction studies, and brand positioning studies. A shared understanding of existing knowledge on the topic is essential to provide solid ground to work from, to prevent double work, and, particularly in this case, to acknowledge previous efforts done by stakeholders. In the field research of stage 2, we conducted 16 contextual home interviews preceded by a sensitizer (Sleeswijk Visser, 2009) in the form of a self-documenting diary (Gaver, Dunne & Pacenti, 1999). In addition, 24 ad hoc street interviews were conducted in several NCS nature areas. All interviews were audio recorded, and key quotes were captured during the interview through time stamping (to help relocate them in the audio recording).

Persona development: The qualitative data was analysed and organised according to theme. The themes were selected both top-down (based on the researchers' previous experience) and bottom-up (emerged from the data). Then these themes were organised into clusters on the basis of motivations such as: what are people hoping to find in nature, what do people expect from NCS in their relationship with nature, and what type of role would people like to play in protecting nature. By looking at how people differed on these motivations 6 motivational clusters were distinguished, which were then enriched on the basis of both desk and field research. These enriched clusters resulted in detailed personas, based on motivations describing a persona's relation to nature, behaviour in nature, and expectations of NCS.

Persona validation: The persona profiles were validated quantitatively by the commercial research agency participating in the project. In a representative sample of the target group (n=1,200), the agency assessed the extent to which respondents related to each of the attributes that underlied the personas (e.g. "I am an adventurer"; "I am annoyed when people show disrespect towards nature"). Responses were subjected to a statistical cluster analysis. The resulting clusters were then compared to the personas. Results showed that the six personas were statistically congruent with the clusters identified through quantitative analysis of the representative sample data ('real people'). The six clusters together represented 99% of the sample, which indicates that the personas indeed covered the target group well. In addition, the quantitative study included other attributes as well, such as media usage, channel preferences, and socio-demographic variables. Although the researchers found a poor correlation between the personas and the socio-demographic variables age, gender, and geographic region, the other variables (related to actual behaviour and preferences) helped the project team to further enrich the personas with these variables. For example, the persona that was more adventurous tended to be more active on social media while the persona that was more interested in nature preservation was less active on social media.

Outcomes: Six quantitatively validated personas that enabled the consecutive co-creation of different value propositions to target marketing activation and persuasive design, to eventually increase member acquisition and retention. Currently NCS is in the process of piloting these value propositions and assessing which ones lead to the highest activation of the potential target group.

Reflection on persona development process: The personas received great support amongst NCS staff; they were found inspiring to work with, seen as realistic and relevant, and supportive in decision making process. Some issues we encountered were that the target behaviour appeared to consist of multiple, poorly correlated drivers for behaviours: those related to nature and those related to actively supporting charities. This made it difficult to capture both behaviours in a limited number of coherent personas. Designing suitable value propositions for all six personas would create a too large portfolio and too much organisational complexity. Therefore, NCS is currently considering a clustering of personas for practical purposes. Lastly, the personas did not correlate statistically significant with age, gender, and geographic region, which means that new ways have to be sought to reach these people.

3 Lessons learnt

The cases have in common that the personas served their purpose of providing the project team and stakeholders with a vivid image of the different people in their target groups. In all cases, the development of personas revealed important challenges that could hinder the use and acceptability of personas by designers and health professionals in the public domain. The cases differed considerably in the way personas were developed, the level of uncertainty that the project team was willing to accept in translating data into personas, the amount of data that was collected, and the purpose of the personas (only internal vs. also external use). The different methodologies applied in the three different cases raise questions about whether there is a 'right' way to develop personas in this domain, and how to determine the best way. The experienced challenges are discussed next.

3.1 *Challenge 1: capturing complex behaviour*

It is challenging to grasp behaviour with personas when...

... there are multiple behaviours or diverse populations involved.

In the public domain, it is important to target each and every subgroup, as public organisations often have a responsibility to contribute to an inclusive society. Stakeholders in the public domain might therefore be hesitant to focus on a specific part of the population. That was also the situation in our substance use case. The aim was to include all subpopulations related to alcohol and drug use, including both users and non-users, and users of alcohol and/or any kind of drug. The result was a tremendous amount of data, and many different personas. Similarly, the nature case experienced difficulties caused by the need to capture multiple, even poorly correlated behaviours (those related to experiencing nature and those related to supporting charity). Also, in the latter case, the identification of six distinct personas asks for the design of six differentiated value propositions, which is deemed unfeasible.

... the target group will change in the near future.

In our smartphone case, most respondents in the target group did not perform the risky behaviour of using their smartphones while riding a bike, yet. In fact, most respondents in the target group appeared to be quite positive about the target behaviour of not using it in traffic. The problem analysis showed that this behaviour would increase in the year ahead of them. From literature, we knew that the young adolescents were about to change considerably, e.g. showing more risk-seeking behaviour (like using their phone while cycling), and being more sensitive to peer influence. Therefore, both the target behaviour and its determinants were expected to change in the next years. How to capture the expected dynamics in the personas? One solution could be to collect longitudinal data to continuously update the original personas.

... there are changes in rules and regulations.

In our smartphone case, the persona project was just on a roll when the public debate opened up around the prohibition of this risky behaviour by law. So far, prohibition is not in force, but if it will, the determinants of the behaviour will likely change, as will our personas. This instable regulatory context applies to many behaviours in the public domain.

3.2 *Challenge 2: Taking a responsible leap of faith*

In each of the three cases, the personas could not be created by only statistically analysing or restructuring the data. Personas emerge from the research data through a process of collaborative, creative reasoning, sometimes referred to as abduction. Persona development requires an act of interpretation, or sense-making of the data: a wilful filtering and enriching of the data that turns them into useful personas that will help design better solutions. Internally, we call this interpretative phase the 'leap of faith', because it requires the project team to agree on a certain level of uncertainty, which in turn requires trust among the team members. They have to agree on a set of personas with a set of

attributes that is not either right or wrong, but rather a contextual and educated best guess. Or as Pruitt and Grudin (2003) phrased it: “Persona use does require decision making. It isn't a science.”

Behavioural scientists have difficulties with taking the leap of faith. As Goodwin (2009) already described, “The step of assigning characteristics with no regard for the data, is a difficult step for researchers.” Especially in the public domain, where evidence-based working has high priority, it is difficult to draw conclusions about the personas that cannot be retrieved directly from the empirical data. One way to fill these blanks is to do thorough desk research preceding the field work; a step that was taken in all three cases in this paper, but that is sometimes neglected in persona development. Another way to fill these blanks could be to exploit practice-based experiences.

3.3 Challenge 3: Transferring personas

Sharing insights is common in the public domain. By sharing knowledge we can help each other to better tackle societal challenges. But is it feasible to transfer personas?

In all three cases the personas were shared with the problem owner. Sharing the personas certainly helped bringing the target group alive to the problem owner. Because the problem owners were closely involved with the project's progress through frequent meetings, the problem owners were well able to interpret personas correctly. However, what happens when personas leave the project team to be used by third parties who were not involved in the development of the personas, is less certain.

Sharing the personas with third parties was exactly the purpose in two of our cases. In both the substance use and nature case, the purpose of the personas was to inform and inspire professionals working with the target group, i.e. other parties than the research team. The project team who developed the personas had a detailed understanding of the personas, and how they mutually differed. It is the question whether other parties are able to distinguish the personas correctly. The naming of personas, the pictures representing them, or non-essential socio-demographic details could unintentionally distract from the essence of the personas. Misinterpretation of the personas by third parties lies in wait, meaning some form of guidance by the creators is necessary when the personas are to be transferred to others.

If personas are used for inspirational purposes within the project team only, like in the smartphone case, transferability is less of an issue. However, it is an important issue when the personas will be used outside the project team. One way to enhance the transferability of personas is to validate them, either among experts, users, or both. A validation will be part of the intended follow-up study in the substance use case. This will help in checking whether the personas are interpreted correctly by third parties. In the nature case, a quantitative validation was carried out with users. Although useful, this validation in a large-size sample was time-consuming and expensive. This type of validation requires expertise in quantitative research, but also, it sets extra requirements to the personas. That is, the personas need to be of sufficient resolution. They have to be composed of attributes that are suitable for use in a quantitative survey. Respondents of the survey need to be able to self-assess how they relate to the attributes. The more ‘factual’ the attribute (e.g. education level), the easier it is to self-assess the extent to which it applies to you, whereas the more ‘latent’ the attribute (e.g. intrinsic motivation), the more difficult this is. However, for achieving behaviour change, it is more important to have insight in these latent attributes than in the factual, more superficial attributes. So the paradox here is that validation favours more factual personas, whereas effective behaviour change strategies favour in-depth, motivational personas. Further research should explore the optimum level of validation for different situations of persona usage.

4 Conclusion

The three cases illustrated the potential use of personas in the public domain. Although each of the cases covered entirely different target behaviours and target groups, they revealed similar lessons and challenges. Personas appeared helpful to gain insight into diversity within a target group, to create empathy for the members of the target group, and to have a shared understanding when

communicating about the target group with stakeholders. All this can assist in creating targeted intervention strategies in the public domain. However, the cases also exposed specific challenges related to the use of personas in the public domain.

First, we struggled with capturing the complex behaviours in the public domain with personas. The behaviours involved were variable over time, the (legislative) environment was in motion, and the target groups were highly diverse. In one of the cases, our attempt to fairly capture this complexity led to the development of as much as 14 personas. One of the conclusions of Vosbergen et al. (2015) in their persona study was, that the cognitive load for respondents to understand all the persona information was too high. Considering that they had five personas, this presents us with a real challenge. Second, we identified the tension between the necessary leap of faith and the evidence-based world of intervention strategies to change behaviour in the public domain. Multidisciplinary experiences are necessary to mitigate this tension and to search for accepted ways to make the leap of faith from data to personas as small as possible. Third, we discussed the question of the transferability of personas to third parties. If personas are purely meant to inspire the problem owner to guide further actions aimed at the target group, the need for transferability is quite low, which leaves some more elbow room. However, personas that will be used as a stand-alone tool by third parties ask for additional requirements. For example, too many personifying details may hinder correct interpretation of personas by third parties. This is especially relevant in the public domain, where free sharing of insights and tools is common. Validation of the personas seems to be a promising avenue for handling this challenge. However, as validation always comes with a price, the optimum level of validation needs to be established for each specific context.

Despite the promising match between personas and designing for behavioural interventions in the public domain, it can be challenging to bring together the worlds of designers and behavioural scientists. Differences between designers and scientists in approach, methodology, and view on what constitutes truth, may hinder the exchange of research tools. Whereas designers and design researchers generally take a holistic perspective on a person's experience and acts, scientists' approach to research projects is usually reductionist in nature, attempting to establish the influence of single factors in controlled circumstances (Hermsen, Van der Lugt, Mulder & Renes, 2016).

Behavioural scientists who are usually involved in intervention strategies in the public domain may not accept personas as a serious research tool, because the development of personas is an inherently creative process. Although good personas are grounded in research data, there is always a point in their creation where a leap of faith has to be taken that cannot be completely underpinned by the data alone. The contrast is possibly too sharp with the evidence-based way of working that is both common and required in interventions in the public domain. Specifying, or perhaps even standardising, the methodology to develop and validate personas might help the tool to gain acceptance by professionals in this domain. Another solution might be to not frame personas as a research tool per se, but as a tool bridging reductionist research activities and holistic design activities.

If done properly, the development of personas is an intensive process, both in time and budget. Especially the latter is often scarce and strictly regulated in the public domain. Future research should point out whether the benefits of creating personas do outweigh the costs (in time and money). Moreover, we call for designers and (design) researchers to share experiences with using the persona methodology in the public domain, in order to tackle the experienced challenges and to create a more widely accepted way of developing personas.

5 References

Bukman, S., Vogelzang, L., Bouwknegt, R., Ronteltap, A., Hilhorst, K., & Ward, H. (2016). *Fietsen met focus. [Bike riding with focus.]* Crossmedia communication in the public domain, University of Applied Sciences Utrecht, Utrecht, The Netherlands.

- Chapman, C. N., & Milham, R. P. (2006). The personas' new clothes: methodological and practical arguments against a popular method. In: *Proceedings of the human factors and ergonomics society annual meeting* (50(5), pp. 634-636). Los Angeles, CA, USA: SAGE Publications.
- Cooper, A. (1999). *The Inmates Are Running the Asylum*. Indianapolis, IN, USA: Macmillan Publishing Co., Inc.
- Fishbein, M., Triandis, H.C., Kanfer, F.H., Becker, M., Middlestadt, S.E. & Eichler, A. (2001). Factors influencing behavior and behavior change. In: Baum, A., Revenson, T.A. & Singer, J.E. (eds), *Handbook of Health Psychology*. Lawrence Erlbaum, Mahwah, NJ, pp. 3–17.
- Gaver, W., Dunne, A. & Pacenti, E. (1999). Design: Cultural Probes. *Interactions* 6, 21-29. Doi:10.1145/291224.291235.
- Goldenbeld C., Houtenbos M., & Ehlers E. (2010). Gebruik van draagbare media-apparatuur en mobiele telefoons tijdens het fietsen: resultaten van een grootschalige internetenquête. [*Usage of wearable media equipment and mobile phones while riding a bike: results of a large-scale internet survey.*] Report number: R-2010-5. Second, altered edition. Leidschendam, NL: SWOV.
- Goodwin, K. (2009). *Designing for the digital age: how to create human-centered products and services*. Indiana, USA: Wiley Publishing.
- Hermesen, S., Van der Lugt, R., Mulder, S., & Renes, R. J. (2016). How I learned to appreciate our tame social scientist: experiences in integrating design research and the behavioural sciences. *DRS 2016 Conference Proceedings* (pp. 1375-1389). London, UK.
- Kreuter M. W. & Skinner C. S. (2000). Tailoring: what's in a name? *Health Education Research*, 15, 1-4.
- Matthews, T., Judge, T., & Whittaker, S. (2012). How do designers and user experience professionals actually perceive and use personas? In: *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1219-1228). Austin, Texas, USA.
- Noar S. M. (2006). A 10-year retrospective of research in health mass media campaigns: Where do we go from here? *Journal of health communication*, 11(1), 21-42.
- Noar S. M., Benac, C. N. & Harris M. S. (2007). Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions. *Psychological Bulletin*, 133, 673-693.
- Pruitt, J. & Grudin, J. (2003). Personas: Practice and Theory. In: *Proceedings of Designing For User Experiences* (pp.1-15). San Francisco, CA, USA. doi:10.1145/997078.997089.
- Sleeswijk Visser F. (2009). *Bringing the everyday life of people into design*. Doctoral thesis Delft University of Technology. Sleeswijk Visser, Rotterdam, NL.
- Subrahmaniyan, N., Higginbotham, J. D., & Bisantz, A. M. (2017). Using Personas to Support Augmentative Alternative Communication Device Design: A Validation and Evaluation Study. *International Journal of Human-Computer Interaction*. Doi:10.1080/10447318.2017.1330802
- Vincent, C. J., & Blandford, A. (2014). The challenges of delivering validated personas for medical equipment design. *Applied Ergonomics*, 45(4), 1097-1105.
- Vosbergen, S., Mulder-Wiggers, J.M.R., Lacroix, J. P., Kemps, H. M. C., Kraaijenhagen, R. A., Jaspers, M. W., & Peek, N. (2015). Using personas to tailor educational messages to the preferences of coronary heart disease patients. *Journal of biomedical informatics*, 53, 100-112.
- Whatnall, M.C., Patterson, A. J., Ashton, L. M., & Hutchesson, M. J. (2018). Effectiveness of brief nutrition interventions on dietary behaviours in adults: A systematic review. *Appetite*, 120(1), 335-347. doi: 10.1016/j.appet.2017.09.017.

About the Authors:

Amber Ronteltap is a senior researcher working on various behaviour change projects in the public domain. She has a background in human nutrition (MSc) and consumer sciences (PhD).

Andrea Bukman works as a researcher on behaviour change projects in the public domain. She has a background in human nutrition and obtained her PhD in public health.

Martha de Jonge works on various projects related to youth, risky behaviour, and substance abuse. She has a background in intercultural clinical psychology and anthropology, and a special interest in qualitative research.

Erik Roscam Abbing is managing director of a service design agency and educational board member of a design management master. His background is in industrial design and design management.