Women, blood, and dangerous things: socio-cultural variation in the conceptualization of menstruation

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Abstract

This study examines a collection of expressions for the taboo topic of menstruation in Dutch, German, and Mandarin Chinese. A model for the identification of conceptualization patterns in taboo verbalizations is set up, analyzing each expression according to the X-phemistic mechanisms and, if applicable, the metaphorical source domains or metonymic vehicles at its origin. The various conceptualizations of menstruation are approached from a socio-cultural perspective; variation in conceptualization is examined through a correspondence regression analysis with three speaker-related explanatory variables (L1 and associated cultural background, menstrual experience, and age group). The underlying interest is linguo-cultural as the study aims to verify whether dominant menstrual attitudes are reflected in the linguistic conceptualization of menstruation within each socio-cultural group. Such correlations are indeed found, although the youngest age-group shows some unexpected linguistic behavior.

1. Introduction

This study examines a range of expressions for MENSTRUATION from a cognitive linguistic perspective to gain insight into the ways in which various groups of language users conceptualize the menstrual taboo. Centrally underlying the research design is the idea that different expressions for a particular taboo concept entail different mental categorizations of that phenomenon. Take, for instance, the English expressions *menstrual cycle* and *our aunt from Redfield.* These phrases for menstruation illustrate that verbalizations of taboo concepts can conceptualize the same taboo referent in multiple ways as they highlight different aspects of the

menstrual process (its cyclicity versus the color of menstrual blood) and use different techniques to represent the taboo concept (a classical loan versus personification and wordplay).

As culture, language, and taboo are intrinsically linked, the linguistic conceptualization of a taboo concept such as menstruation may be strongly determined by its socio-cultural functioning. After all, although taboos are often concerned with universal, human phenomena such as death, illness, and menstruation, the actual behavior toward these phenomena may vary across societies. Whereas menstruation is considered taboo both in Western and Eastern cultures (Cheng et al., 2007), for instance, Guo et al. (2022) notice that whereas "Western societies have become increasingly open to the discussion of menstruation shame" (p. 5), in Chinese society, despite recent sparking of the debate around the menstrual taboo, "deeply ingrained beliefs continue to impact Chinese women, subjecting them to moral, linguistic, and behavioral constraints" (pp. 5–6). Therefore, this study aims to explore whether varying socio-cultural attitudes toward menstruation are reflected in the prevailing manners of conceptualizing the taboo concept. Negative or secretive attitudes toward menstruation can be particularly harmful for menstruators, often resulting in shame or even societal exclusion. Closely investigating how linguistic expressions feature into the stigmatization and concealment of menstruation can provide new and interesting insights into the menstrual taboo.

To achieve this methodologically, we examine menstrual conceptualization in terms of the socio-cultural background of particular language user groups. The focus lies on three socio-cultural variables: L1 and its associated cultural backgrounds (Dutch, German, or Mandarin Chinese), menstrual experience (direct or indirect), and age group (≥ 25 yo, 26–49 yo or 50 ≤ yo). It is expected that these various language user groups have different dominant conceptualizations of menstruation, in line with the prevailing attitudes within their group. Broadly, we classify the societal menstrual attitudes as well as the linguistic conceptualizations of menstruation across three broad categories and hypothesize particular pairings between them. The classification of menstrual conceptualization is based on X-phemistic theory, in which *X-phemistic* is an umbrella term for *euphemistic*, *orthophemistic*, and *dysphemistic* (Allan & Burridge, 2006; Casas Gómez, 2018). Euphemistic conceptualization, which mitigates the intensity and the offensive nature of a taboo concept through its evasive characteristics, is expected in socio-cultural groups which surround menstruation with much secrecy and shame. The taboo is not openly discussed, and references toward menstruation remain vague and indirect. Dysphemistic conceptualization is also linked to a high taboo value for menstruation within a particular socio-cultural group, but involves an intensification of the negative aspects of a taboo concept. It is therefore expected in socio-cultural groups which display a high degree of stigmatization toward menstruation. When discussing menstruation, these groups do so from a highly negative point of view, framing the menstrual process in an unfavorable light. Orthophemistic conceptualization, finally, concerns direct and literal approaches to the taboo concept and is paired with socio-cultural groups attributing least taboo value to menstruation. Within these groups, menstruation is discussed more openly and neutrally. This is the most direct approach to menstruation and takes the menstrual process out of the taboo sphere by representing it as it is.

To gauge secretive, open, negative, and positive attitudes toward menstruation in the various groups, we rely on previous research on the socio-cultural

functioning of the menstrual taboo (see Section 2.1). To distinguish euphemistic, dysphemistic, and orthophemistic conceptualization within menstrual expressions, an innovative combination of frameworks is developed on the basis of earlier research on menstrual expressions (see Sections 2.2 and 2.3). All verbalizations for menstruation collected for the dataset (see Section 3) are subsequently analyzed according to the newly created methodological model (see Section 4). Finally, the correlations between menstrual attitudes and menstrual conceptualizations within the socio-cultural groups at hand are examined through a correspondence regression analysis (see Section 5). The article ends with a discussion in Section 6.

2. Background

2.1. The menstrual taboo

2.1.1. Origins of the menstrual taboo

According to Allan and Burridge (2006) "[t]aboos arise out of social constraints on the individual's behaviour where it can cause discomfort, harm or injury" (p. 1). Taboo topics enter the forbidden sphere due to the risks they pose: bodily effluvia such as menstrual blood may cause contamination, diseases involve physical risks, and subjects such as sex could infringe on upheld moral beliefs. Therefore, direct interaction with taboo objects can lead to problems ranging from social exclusion to even death. The taboo on menstruation is classified under a broader taboo on bodily effluvia by Allan and Burridge (2006), thereby including menstrual blood among other substances such as urine, feces, and semen. These fluids are used for casting spells in folk magic around the world and are deemed to be curative agents in many cultures. However, they are often considered repulsive as well, giving rise to concerns about pollution and fears of contamination. The cultural attitudes under investigation in this study, that is, the prevalent attitudes in Dutch-, German-, and Mandarin Chinese-speaking regions, tend to reflect such a negative approach to menstrual blood, and these fears of contagion are informed by similar historical misconceptions of the menstrual process.

In Western society, it dates back to theories from the ancient Greeks, who believed menstruation to be a process of purification. By losing menstrual blood once per month, women would rid themselves of ill humors (Newton, 2016, p. 19). This position of menstrual blood within humoral theory characterizes the substance as hazardous human waste. Similarly, in pre-modern China, menstrual blood was believed to be the most dangerous bodily fluid, capable of infecting others and of offending supernatural powers (Guo et al., 2022, p. 5; Jiang, 2019, p. 21). These shared pollution concerns led to practices of strict menstrual regulation and of menstrual seclusion in both cultures, where menstruators were carefully controlled and excluded from particular activities and places during their bleeding.

Although medical advances have resulted in an extensive understanding of the menstrual cycle and contagion theories no longer apply, menstruation tends to remain a matter of secrecy, shame, and stigmatization in many socio-cultural groups, with mythical stories about its properties still abounding (Tan et al., 2017). The following section discusses studies that have examined the prevalent attitudes toward menstruation in all groups relevant to this study.

2.1.2. Socio-cultural functioning of the menstrual taboo

2.1.2.1. Menstrual taboo for Dutch, German, and Mandarin Chinese speakers. As cultures, countries, and languages are not monolithic and do not simply display a one-on-one relation among each other, we would ideally look into cultural menstrual attitudes within all regions employing a variety of Dutch, German, or Mandarin Chinese. Speakers of German from Austria, for instance, may have different ideas on menstruation compared to speakers of German from Switzerland, Luxemburg, Germany, or Belgium. Conversely, the languages under investigation are not always the only languages spoken within a particular country; speakers of Mandarin Chinese, for example, cannot be equated with the entire population of China, and Dutch is only one of three official languages in Belgium. Unfortunately, only a limited number of studies have looked into reigning menstrual attitudes in German-, Dutch-, and Mandarin Chinese-speaking regions, which makes it impossible for us to provide a full picture of menstrual attitudes for each language. We will therefore have to make do with the studies that are available, but remain aware of the fact that these do not cover the complete scope of menstrual attitudes for all countries and cultures associated to each language.

Only a few studies have specifically looked into attitudes toward menstruation in Dutch- and German-speaking regions. For Dutch speakers residing in the Netherlands, van Lonkhuijzen et al. (2022) have reported a generally highly negative perception of menstruation. On the basis of a large-scale survey, eight in-depth interviews, and four expert interviews, they found that the driving factors behind menstrual stigmatization in the Netherlands seem to be repulsion of menstrual blood, uncleanliness concerns, and fear of leaking menstrual fluid. However, it should be noted that some positive attitudes were reported as well, framing menstruation as a healthy process associated with fertility. Generally, a mixed yet prevailingly negative attitude toward menstruation can be discerned for Dutch speakers.

In her analysis of media discourse surrounding a striking occurrence on a German TV show, Klein (2021) has observed a change in attitude on the menstrual taboo in Germany. After two cis men came on the show *Die Höhle der Löwen*, a German spin-off of the British *Dragons' Den*, and received investment for their "pinky gloves" (i.e., gloves designed specifically for the disposal of menstrual products), criticism arose on how this event reinforced the dominant idea of menstrual blood as something unclean and repulsive. Although menstrual stigma still appeared present and pervasive in Germany, Klein (2021) also reports "a 'new' menstrual discourse, fostered by the intersection of feminism, gender rights and other social movements, deconstructing dominant narratives of menstruation" (p. 35). This points toward an opening up of the menstrual debate in German-speaking countries.

Such direct discussion of menstruation is a development observed more broadly in the whole of Western society. Western-based brands of sanitary protection Kotex and Libresse, for instance, have begun airing commercials in which the usual blue fluid to promote absorption qualities of menstrual pads is replaced by a more representative red liquid (Patel 2020; Guo et al., 2022, p. 1). However, Thomas (2007) notes that although "within Western culture, messages and campaigns exist to end international menstrual taboos and encourage women's advancement through access to the public sphere (…) the discourses contain messages which continue to portray menstruation as an act that threatens to publicly harm women and expose their weakness" (pp. 65–66). Many educational videos on the menstrual cycle and advertisements for

menstrual products are developed by the companies producing sanitary protection and highlight the need to carefully control the menstrual flux (Newton 2016, p. 53). Both in Dutch- and German-speaking regions, then, an idea of menstrual uncleanliness seems to persist, yet it is increasingly being challenged.

Negative attitudes on menstruation are reported in Western and Eastern cultures. A number of studies have observed such approaches for Mandarin speakers in particular. For Taiwanese junior high school students, for instance, Cheng et al. (2007) have observed a considerable lack of knowledge about the menstrual process and generally negative attitudes on menstruation. This was especially the case for the male subgroup of participants (see Section 2.1.2.2). Approaching the study of menstrual attitudes from another perspective, Peng et al. (2023) conducted a comparison study of English and Chinese menstrual tracking apps and found that menstrual symptoms were framed slightly more negatively in the Chinese digital menstrual trackers. Peng et al. see this as a reflection of the general attitude toward menstruation in the more socially conservative China, in which "menstruation is treated as a dirty, polluting bodily waste" (p. 3). As it is still associated with uncleanliness, the menstrual cycle remains surrounded by shame and secrecy (Guo et al., 2022, p. 5), and menstrual blood ought to be controlled and hidden. The institutionalization of this idea is exemplified by the fact that the China Advertisement Association prohibits the use of red liquid for the depiction of menstrual blood in advertisements for sanitary products. Regulations such as these prevent a direct approach to periods.

However, a couple of developments have opened up the topic to public discussion in China. During the COVID-19 pandemic, the issue of period poverty was brought to light. Grassroots campaigns started collecting money and sanitary products for those who needed it and raised awareness for the problem. This increase in consciousness resulted in public debates on period poverty, gender narratives, and menstrual stigma in China (Guo et al., 2022, p. 6). But although change is on its way, there is a notable difference with Dutch- and German-speaking countries, especially in terms of legislation, marketing, and the dominant discourse. Whereas neutral and negative attitudes in Dutch- and German-speaking countries appear rather outspoken, Chinese-speaking countries mostly display a lack of menstrual visibility, either positive or negative. This secretive attitude and reluctance to break the taboo are not unsurprising in the light of certain core values and general attitudes in Chinese society. Lee (2020, p. 1), for instance, stresses the role of ritual and politeness in Chinese culture: "[f]rom the Chinese perspective, politeness is conceptualized and deeply rooted in its long tradition, and is a core substance of behavioral norms". As tabooed behaviors such as menstruation and discussing menstruation breach politeness constraints because they are considered to impose on others and to offend them, they are generally avoided in a polite society. A more evasive attitude within Chinese culture vis-à-vis the menstrual taboo is thus not unexpected.

2.1.2.2. Menstrual taboo for menstruators and non-menstruators. It is important to note that not all people who menstruate are women and that not all people who are women are menstruators. A classification in terms of direct and indirect menstrual experience therefore allows for a larger, more representative possibility of gender profiles under each category (e.g., cis women, trans men and non-binary people with menstrual organs for "direct" and cis men, and trans women and non-binary people

without menstrual organs for "indirect"). Unfortunately, most studies on gender differences in menstrual attitudes have approached the issue on the basis of a gender distinction based solely on assigned sex. As the group of menstruators can be assumed to largely overlap with the group of cis women and the group of non-menstruators to cis men, however, the findings of previous studies using an assigned female/male sex distinction are cautiously assumed to be relevant for the current study as well.

In a questionnaire distributed by Allan and Burridge in Melbourne (results printed in Allan & Burridge, 1991, p. 74 and reprinted in 2006, p. 163), the researchers asked respondents to rank human substances along a scale ranging from not-R (not revolting) to RRR (extremely revolting). Menstrual blood was the only fluid to be scored significantly differently depending on the assigned sex of the respondent. Whereas 80% of male respondents rated menstrual blood RR or RRR, only 47% of female respondents did so. On the other side of the scale, 17% of the women rated the effluvium not-R in sharp contrast to 0% of the men. These different attitudes toward menstrual blood seem to be reflected in attitudes toward menstruation and menstruators at large. A study by Forbes et al. (2003), for instance, examined the perception of "the menstruating woman" (p. 58) by 224 European American college students and found significant differences depending on the assigned sex of the participant. Male respondents not only tended to rate menstruating women significantly less open, agreeable, and conscientious than the midpoint (i.e., than the ratings of a non-menstruating woman), but these ratings were also significantly lower than the ratings attributed by female respondents. In line with the findings of Allan and Burridge (1991), Forbes et al. (2003) further note that "[r]esiduals of menstrual taboos about cleanliness may have appeared in the below-midpoint rating on "clean and fresh" by men." (p. 61).

The menstrual process itself, too, tends to be perceived more negatively by men than by women. Cheng et al. (2007) found that male Taiwanese adolescents scored menstruation significantly more negatively than their female peers did. However, the study did not find a statistically significant difference in terms of secrecy and shame surrounding menstruation; male and female respondents showed no significant variation in their feelings of embarrassment or opinions on concealing menstruation.

From a historical perspective, stigmatizing attitudes from non-menstruators are not unexpected as patriarchal ideology has often contributed to the menstrual taboo. The attribution of contagious properties to menstrual blood was a theory of male scholars and physicians (Newton 2016, p. 22), whereas female writers of ancient Greece and Rome represented menstrual fluid mostly as a curative, magical substance (Tan et al., 2017). Even up until the early modern period, during the age of women's emancipation, a range of male-led studies were published on the negative effects of menstruation. They depicted the biological process as a weakening illness, rendering women unfit for higher education or full-time employment. Such uses of the menstrual cycle as a politicized instrument by male societal leaders (Newton 2016, p. 32) still seem to have present-day consequences.

2.1.2.3. Menstrual taboo across generations. A few studies have tested menstrual attitudes across age groups. The answers to a questionnaire distributed by Chrisler (1988) among students of 18 to 23 years old and adults of 30 to 39 years old in New Jersey confirmed that age significantly contributes to variation in attitudes toward

menstruation. The results pointed out that the younger group tended to characterize menstruation as particularly more debilitating and bothersome than the middle-aged group but that the middle-aged group was less inclined to deny the effects of menstruation. In terms of secretive attitudes toward menstruation, a study by Marván et al. (2005), conducted among 221 Mexican college students and adults, found that their participant group of 50–60 years old was significantly more likely to believe menstruation should be handled discretely than the 18–23 year old group. This suggests that menstruation maintains a higher taboo status in the generation of 50 and older.

2.2. Previous studies on verbalizations for menstruation

Earlier studies on menstrual expressions have approached verbalizations for menstruation from a variety of perspectives, yet a common denominator appears to be a categorization of the expressions in terms of either their semantic content or their connotational potential. An example of a connotation-based categorization is Agyekum (2002), who approaches menstrual expressions in Akan, a language spoken in the Ashanti, Brong-Ahafo, Western, Central, Eastern, and Volta regions of Ghana. The study examines terminology for menstruation from a primarily anthropological viewpoint and distinguishes two main categories: one encompassing all negative perceptions of menstruation (e.g., pollution and failed production) and one encompassing all positive perspectives on the phenomenon (e.g., power, purification, and fertility). This approach to menstrual expressions is reminiscent of the framework of X-phemistic theory, which categorizes expressions on account of their emotional connotation (*euphemistic* for positive and harmless, *dysphemistic* for negative and offensive, and *orthophemistic* for formal and neutral).

Within the group of semantic categorizations, most studies introduce an ad hoc classification based on the content of the expressions at hand (Allan & Burridge, 2006; Ernster, 1975; Hays, 1987; Joffe, 1948; Newton, 2016). The most commonly occurring categories in these classifications include "periodicity" (e.g., *time of the month*), "the color red" (e.g., *red week*), "visitation" (e.g., *a visit from Auntie Flo*), "illness" (e.g., *to come sick*), and "sanitary protection" (e.g., *on the rags*). Gathigia et al. (2018) take a more systematic approach to categorizing menstruation verbalizations and operate from the framework of conceptual metaphor theory (CMT). By identifying the *metaphorical mappings* underlying the menstrual expressions in their dataset, they aim to discover more about the way Gĩkũyũ speakers of Kenya conceptualize and mentally organize the taboo concept. Metaphorical mappings are a theoretical notion central to conceptual metaphor theory, which posits that the metaphorical process involves the mapping between two conceptual domains: a source domain and a target domain (Lakoff & Johnson, 1980). The source domain is mapped onto the target domain on the basis of certain correspondences, thereby conceptualizing the target domain as the source domain. A Gĩkũyũ expression such as *mweri* "a month," for instance, represents an underlying conceptual metaphorical mapping that can be phrased as MENSTRUATION IS A PERIOD, in which MENSTRUATION is the target domain, and PERIOD is the source domain. According to Gathigia et al. (2018), "metaphor is so pervasive in the conceptualization of menstruation that it appears to play an indispensable role in our understanding of it" (p. 176). Menstruation is not the only taboo concept which may be examined on

the basis of metaphor theory. The potential of CMT for the analysis of taboo verbalizations was also highlighted by Crespo-Fernández (2008) in his study of sex-related euphemisms and dysphemisms in terms of conceptual metaphors.

A number of studies have additionally looked into menstrual expressions from a socio-cultural perspective, with a particular focus on the role of cultures and gender distinctions. Joffe (1948), departing from the idea that "[t]he nature of the words for menstruation in a given culture may illuminate the prevalent attitudes toward the subject" (p. 181), examines terms for menstruation in Irish, Polish, French, Italian, German, East European Jewish, and American culture. As the sampling for terminology did not occur systematically, however, it is highly possible that the occurrence of certain semantic categories across menstrual expressions, in particular cultures, is much more prevalent than presented in the study. Ernster (1975) and Newton (2016) apply a gendered perspective and investigate typically female versus typically male uses of menstrual expressions. Their findings suggest that men and women tend to draw from different semantic sets. On the one hand, Ernster (1975) observes typically male usage of the 'red' category, with similar reports by Newton (2016) for 'blood flow'. On the other hand, Ernster (1975) finds that women tend to characterize menstruation euphemistically as 'female visitor, friend, or relative', and Newton (2016) notes a frequent conceptualization of menstruation in terms of 'periodicity' for female respondents.

2.3. A combination of frameworks for the study of taboo conceptualization

From the overview of previous studies, two main frameworks stand out as fitting candidates for the systematic categorization of conceptualization patterns within taboo verbalizations. First, X-phemistic theory offers a classification on the basis of connotation, distinguishing positive, neutral, and negative perspectives on the taboo referent. Second, the CMT framework has been proven to provide similarly insightful categorizations of perspectives on taboo concepts through figurative language (Crespo-Fernández, 2008; Gathigia et al., 2018).

2.3.1. X-phemistic mechanisms

Traditional structuralist theories mostly interpret X-phemisms as a purely lexical phenomenon. Expressions are classified as a euphemism, orthophemism, or dysphemism, which are in their turn defined as linguistic substitutes for a tabooed word (e.g., Ullman's (1964) description of a euphemism as a "harmless substitute" (205)). This way, the entire analysis of an X-phemism is restricted to the lexical plane: both the start and ending points of the implied substitution process are lexical expressions. Cognitivist accounts of X-phemisms (Casas Gómez, 2018; Crespo-Fernández, 2019) have questioned the notion of a lexical starting point of the X-phemistic substitution process because frequently, it is challenging to strictly pinpoint such an original tabooed expression. Which expression, for instance, is a harmless substitute like *our aunt from Redfield* replacing? *Menstruation* seems to be a logical candidate, but why not *menses*, *bleeding*, or *menstrual cycle*? Essentially, it seems highly unlikely that all menstrual expressions have sprouted from a desire to replace one particular "Über-expression". Casas Gómez (1986) therefore suggests to not put the lexical, but the conceptual taboo at the origin of X-phemisms: "instead of a forbidden vocabulary (as a base for 'substitutions'), we should [consider speaking] of a conceptual

interdiction as the starting point for different euphemistic or dysphemistic formulae" (p. 19).

If we discard the notion of a lexical substitution process and replace it by an onomasiological transition from the conceptual taboo toward a lexical X-phemistic item, the question arises which process, if not substitution, is responsible for this transition. Casas Gómez (1986) compiled a variety of potential processes, or *X-phemistic mechanisms*, into an extensive overview. X-phemistic mechanisms are linguistic processes such as phonetic reduction, foreign loan, or metaphor, which bring about euphemistic, orthophemistic, or dysphemistic expressions. Processes that contribute to an attenuation of the taboo concept and result in euphemistic expressions could then be called euphemistic mechanisms, whereas the dysphemistic mechanisms allow the speaker to reinforce the forbidden reality through dysphemistic expressions. Orthophemistic expressions, finally, can be said to have neutralizing orthophemistic mechanisms at their origin.

Casas Gómez (1986) illustrates each X-phemistic mechanism with Spanish expressions for prostitution, but with the exception of a few language-specific processes (e.g., nominal inflection for gender), the framework is flexible enough to categorize other languages and topics as well. The classification places all euphemistic and dysphemistic mechanisms along three levels: a paralinguistic level, a formal level, and a level of meaning. The first encompasses intonation and gestures, usually in combination with (one of) the other two levels. The second entails phonetic (e.g., reduction), morphological (e.g., derivation), and syntactic (e.g., omission) procedures. The third, finally, contains a variety of lexical (e.g., foreign loan) and semantic (e.g., metaphor and metonymy) mechanisms. For the clarification and exemplification of each of the X-phemistic mechanisms found for menstruation, see Section 4.1.1.

2.3.2. Conceptual metaphor theory and conceptual metonymy theory

The conception of metaphor and metonymy as essentially cognitive phenomena which provide insight into the way in which language users conceptualize and categorize their environment is derived from the influential frameworks of conceptual metaphor theory (Kövecses, 2017; Lakoff, 1987, 1993; Lakoff & Johnson, 1980) and conceptual metonymy theory (Barcelona & Blanco-Carrión, 2018; Gibbs, 1994; Panther & Radden, 1999; Panther & Thornburg, 2007) (CMT). At the basis of these frameworks lies the claim that contrary to traditional theory, metaphor and metonymy are all-pervasive, central phenomena not just of everyday language, but primarily of everyday thought.

Essential for understanding and describing metaphor and metonymy within CMT is the concept of domains (similar concepts have also been referred to as *frames, schemas, scenes*, or *spaces* in subsequent research, see Kövecses, 2022). Lakoff and Johnson (1980) interpret metaphor as a cross-domain mapping that takes place between a conceptual source domain and a conceptual target domain and allows the target domain to be presented in terms of the source domain. The mapping entails a set of systematic correspondences between both domains. For instance, the cross-domain mapping that occurs in the conceptual metaphor ARGUMENT IS WAR is based on correspondences between an argument and warfare, for example, the link between the person one argues with and a war opponent. The metaphor is subsequently reflected in ordinary language with a wide range of metaphorical expressions or

linguistic metaphors, such as "Your claims are *indefensible*. He *attacked every weak point* in my argument" (Lakoff & Johnson, 1980, p. 4).

A similar interpretation holds for metonymy. Whereas a conceptual *metaphor* is a mapping across two domains, conceptual *metonymy* is "a particular type of mental mapping (…) whereby we conceive of an entire person, object, or event by understanding a salient part of a person, object or event" (Gibbs, 1999, p. 66). A metonymic mapping, then, does not represent one thing in terms of another, but represents one thing in terms of its relation to something else. The relation between these two things is traditionally seen as one of contiguity. According to Lakoff and Johnson (1980), the metonymic process involves only one conceptual domain. Within that domain, two entities are present: the *vehicle* and the *target*. In a conceptual metonymy, the vehicle maps onto the target and thereby functions as the reference point that affords mental access to the target (Langacker, 1993). For instance, in the example, *She's just a pretty face*, the role of the vehicle is taken up by *face*, allowing mental access to the concept of *woman*. The fact that the woman has a pretty face is specifically foregrounded; the vehicle is conceptually salient in the metonymic expression.

By analyzing metaphor and metonymy in expressions for a particular concept, we gain further insight into the ways in which language users choose to conceptualize and categorize that concept in language. As shown by previous onomasiological studies such as Geeraerts and Gevaert (2008) for ANGER and Zhang et al. (2015) for WOMAN, metaphor and metonymy provide interesting information on how a concept is mentally represented and on which of its aspects are deemed salient by language users.

3. Data

In view of our research objective, menstrual expressions were collected in such a way that each expression could be connected to an individual speaker and their socio-cultural features. To this end, an online survey was designed using the survey software platform Qualtrics. Three versions were composed and sent out to the relevant native speaker respondent groups: one written entirely in Dutch, one in German, and one in Mandarin Chinese. The collected responses on the three surveys were merged into one large dataset with a total amount of 516 respondents. The respondents were found through various social media platforms, most notably Facebook and LinkedIn, and mailing lists of KU Leuven, Klagenfurt University, and the association for students of Sinology in Leuven. Participants ranged from trained linguists to linguistic laymen, that is, people with no (academic or other) background in linguistics. The data were collected anonymously, and each respondent gave their informed consent to participate in this study. Respondents could stop the survey at all times, in which case no data were retained. No personally identifiable data were collected.

The question on menstrual expressions took the form of an open survey question, in line with the *free-recall-task method* used by Agyekum (2002) in his study on menstrual expressions among the Akan. An English translation of its phrasing is provided below:

"What words and/or expressions do you know in [Dutch/German/Mandarin Chinese] for the concept of menstruation? These range from synonyms for

menstruation to (formal or informal) expressions that are used to indicate that someone is menstruating. List all the words/expressions you know in [Dutch/German/Mandarin Chinese]."

As is apparent from the question, the survey did not necessarily aim at identifying menstrual expressions in language use. Respondents were encouraged to write down all words they were aware of whether or not they used them frequently. This means that the survey does not gather any information on the attitudes of the respondents toward the expressions they provided. However, this is not problematic for the current research objective. To explore whether the prevalent attitudes toward menstruation within a given socio-cultural speech community are reflected in their menstrual expressions, it is reasonable to examine all expressions circulating within that community, and thus, all expressions the community has knowledge of. A particular language user might not use a certain menstrual expression, but the cognitive storage of the expression still influences the language user's conceptualization of menstruation.

Besides menstrual expressions, the survey also gathered information on the socio-cultural background of each respondent. For L1 (and associated cultural backgrounds), the survey contained a question on the language knowledge of the respondent. Participants indicating anything less than an L1 knowledge level for the language in question were excluded from the analysis. The three languages (Dutch, German, and Mandarin Chinese, the latter of which often is considered a language in itself rather than a variety of a superordinate Chinese language, as it is not mutually intelligible to other Chinese varieties, see for example, Chaoju and van Heuven (2009)) were carefully chosen for a combination of theoretical and practical reasons. From a theoretical perspective, the choice of languages enables us to examine the effect of differing genetic as well as geographical distance between languages in taboo verbalizations. Dutch and German are both West-Germanic languages of the Indo-European family, and the close vicinity of Dutch- and German-speaking countries enables a fair degree of language contact. Sino-Tibetan Mandarin, on the other hand, is both genetically and geographically much removed from the other two languages. This language combination allows us to examine whether menstrual verbalizations in each of the languages reflect geographical closeness vis-à-vis divergence, or whether a certain degree of universality can be discerned. From a practical perspective, Dutch, German, and Mandarin speakers were most available to serve as survey respondents in terms of access (online as well as through the affiliated institution of the researchers). Moreover, for all three languages, the literature on the socio-cultural attitudes toward the menstrual taboo in the corresponding regions could be found, be it to a limited extent.

For the socio-cultural feature of menstrual experience, respondents were asked to indicate whether or not they had ever menstruated. Respondents indicating 'yes' were classified under the group of direct experience, whereas those indicating 'no' were accommodated under indirect experience. For age, lastly, respondents were asked to provide their year of birth, on the basis of which they were further categorized into three age-groups with relative labels young (≥ 25 yo), middle (26–49 yo), and old (≤ 50 yo). These age intervals encompass an adolescent generation, an adult generation, and a matured generation, each experiencing different phases of life and, in the case of menstruators, different phases of menstruation. Especially the cut-off point at 50 years old was chosen to reflect

the average menopausal age, an important point in the menstrual life span. As the question on menstrual experience makes no distinction between those respondents before and those after the menopausal threshold, the addition of such a cut-off point through the age variable nevertheless makes it possible to distribute respondents accordingly.

The total of 516 respondents was the result of the addition of 229 German, 217 Dutch, and 70 Mandarin Chinese native speakers. Of the 516 respondents, 431 respondents indicated that they had directly experienced menstruation, whereas 85 respondents had not. The large difference in number is most likely due to a bias caused by the subject of the survey: despite stressing that people of all menstrual experiences and genders could fill in the survey, many non-menstruators seemed to believe that a survey on menstruation was not something they could contribute to. In terms of age-groups, the youngest group ranges from teenagers of 16 years to adolescents of 25 years and consists of 202 respondents. The middle group comprises 256 adults. The older group ranges from 50- to 78-year olds and contains 58 respondents. An overview of the respondent distribution across the three subcategories is provided in Table 1.

As is immediately apparent, the dataset sizes vary considerably, and Mandarin speakers, non-menstruators, and older respondents are especially underrepresented. For Chinese older non-menstruators, we do not have any respondents, which is a limitation of the study that should be taken into account when examining the results. However, as most respondents contribute multiple expressions, and most expressions have multiple X-phemistic mechanisms and/or sources at their origin, the eventual number of data points for the analysis (see Section 4.3 and Supplementary material S2) lies much higher than a total of 516 as the total number of data points amounts to 4048 for X-phemistic mechanism and to 2483 for source.

Before further analyzing the reported expressions, a few of them were removed from the dataset because they do not refer to the actual act of menstruation, for example, German *Damenbinde* 'sanitary pad' (literally 'lady bandage'). This differs from expressions such as Dutch *vodden* 'rags' in that *vodden* is not simply an (archaic) reference to sanitary protection, but really is used to indicate that somebody is menstruating, cf. *ze heeft haar vodden* 'she's on the rags' (literally 'she has her rags'). In contrast, it is not possible to speak of, say, *Damenbinden haben* 'to have sanitary pads' to refer to menstruation in German. For the set-up of the Mandarin questionnaire and the revision and translation of the Mandarin responses, the help of a sinologist was enlisted. In total, 2141 submitted menstrual expressions were retained, distributed over 275 unique lexemes.

Table 1. Respondents per socio-cultural subgroup

	CHI			DE			NL			Total
	Indirect	Direct		Indirect	Direct		Indirect	Direct		
Young	7	9	**16**	6	34	**40**	35	111	**146**	**202**
Middle	5	44	**49**	12	156	**168**	10	29	**39**	**256**
Old	0	5	**5**	3	18	**21**	7	25	**32**	**58**
Total	**12**	**58**	**70**	**21**	**208**	**229**	**52**	**165**	**217**	**516**

The significance of the bold values is simply the (sub)totals of each row or column.

4. Methods

To investigate whether variation in conceptualization patterns for menstruation can be explained in terms of socio-cultural factors, correspondence regression analysis is employed. The models for the two regression analyses comprise one response variable each, and the same three explanatory variables. The response variables measure conceptualization patterns on the basis of two separate cognitive linguistic frameworks: X-phemistic mechanisms (see Section 4.1.1) and conceptual sources (see Section 4.1.2). The explanatory variables measure socio-cultural variation between the respondents. The general hypothesis that the prevalent menstrual attitude within a socio-cultural group is reflected in their menstrual expressions is further specified for each group in Section 4.2. Section 4.3 provides more information on the statistical technique of correspondence regression analysis.

4.1. Two response variables

4.1.1. X-phemistic mechanism

As this study is built on written data, it will focus exclusively on the formal level and the level of meaning within Casas Gómez's (1986) overview of X-phemistic mechanisms. It should be noted that many of the mechanisms on these levels take a linguistic item as their input, which seems to disagree with Casas Gómez's (2018, p. 26) argument for an onomasiological approach starting from cognition (see Section 2.3.1). Rather than entertaining a certain semantic relation with the initial taboo concept, all processes on the formal level (e.g., phonetic reduction and paronym substitution), as well as all *lexical* processes on the level of meaning (e.g., foreign loan and archaism), merely adapt or substitute words and phrases for that concept. An exception is the last category, that is, *semantic* processes on the level of meaning (e.g., metaphor and metonymy). We have chosen to include the mechanisms with linguistic input but interpret them as secondary to those with conceptual input; they adapt words or phrases that have come about through a previous semantic process. Such an account has the important advantage that it allows taboo verbalizations to be characterized more thoroughly. For example, the German term *Peri* has both semantic and formal processes at its origin; it is the result of the semantic process of metonymy (PERIODICITY STANDS FOR MENSTRUATION), followed by the formal process of phonetic reduction (of *Periode* 'period').

Each menstrual expression in the dataset was thus annotated according to all X-phemistic mechanisms at its origin. This resulted in a few adaptations to the original model. On the one hand, not all categories introduced by Casas Gómez (1986) were present in the data. On the other hand, the data invited the addition of two additional mechanisms: code-switching (e.g., German *days*, an English translation of the common German menstrual expression *Tage*) and creative reinterpretation, a term which applies to phrases that are usually used to refer to existing entities that are themselves not connected to menstruation but contain elements that are (e.g., Dutch *rode loper* 'red carpet', literally 'red runner', whose elements are connected to the color and fluidity of menstrual blood). In total, 19 final values for the X-phemistic mechanism variable can be discerned. An overview of all mechanisms is given in Table 2. If the process occurs in one or more of the examined languages, an example in each of those languages and its literal translation is given in the second column.

Table 2. X-phemistic mechanisms in the dataset

X-phemistic mechanism	Examples
Added	
Code-switching	German *days* from German *Tage* 'days'
Creative reinterpretation	Dutch *rode ridder* 'red knight'
	German *roter Baron* 'red baron'
Formal	
Phonetic	
Reduction	Dutch *regels* from *regelmatig* 'on a regular basis'
	German *Peri* from *Periode* 'period'
	Mandarin *M.* from the loan *menstruation*
Paronym substitution	German *eine Tagung abhalten* 'to hold a conference', based on phonetic similarity with *Tage* 'days'
Morphological	
Derivation	Dutch *regels*; an *s*-plural was added to the form *regel* (in its turn a reduction of *regelmatig*)
	German *Menstruation* 'menstruation', derived from the Latin form *mensis* 'month'
Composition	Dutch *rode pauze* 'red break'
	German *Erdbeerwoche* 'strawberry week'
	Mandarin 月信 'monthly letter'
Syntactic	
Syntagmatic grouping	Dutch *eitjes voor het ontbijt* 'eggs for breakfast', with postmodifier *voor het ontbijt* reinforcing a less tabooed interpretation of *eitjes*
	German *spezielle Zeit im Monat* 'special time of the month'
	Mandarin 好事 'good thing'
Meaning	
Lexical	
Foreign loan	Dutch *menstruatie* 'menstruation' from Latin *mensis* 'month'
	German *shark week* from English
	Mandarin *M.* from English *menstruation*
Semantic calque	Dutch *haaienweek* 'shark week' from English
Cultism	Dutch *cyclus* 'cycle'
	German *Zyklusblutung* 'cycle bleeding'
	Mandarin 癸水 '*cycle day* water'
Archaism	Dutch *maandstonden* 'monthly time interval'
	German *am Fetzn sitzen* 'to sit on cloths'
Semantic	
Metaphor	See Table 3
Metonymy	See Table 4
Antonomasia	Dutch *moeder natuur* 'mother nature', *de Russen* 'the Russians'
	German *Tante Rubina* 'aunt Ruby', Blutgräfin 'blood countess'
	Mandarin 老朋友 'old friend', 大姨妈 'big aunt'
Antiphrasis	Dutch *maandelijks cadeautje* 'monthly present'
	German *Kirmes* 'fun fair'
Litotes	Dutch *niet zwanger zijn* 'to not be pregnant'
	German *definitiv nicht-schwanger* 'definitely not pregnant'
Periphrasis	Dutch *maandelijkse bloeding* 'monthly bleeding'
	German *Monatsblutung* 'monthly bleeding'
	Mandarin 生理期 'physiological period'
Allusive circumlocution	Dutch *meer naar het toilet moeten* 'to need to go to the toilet more often'
Generic term	Dutch *ik heb mijn dingens* 'I have got my thingies'
	German *Frauensache* 'women thing'
	Mandarin 那个 'that (thing)'

Notice that many of the expressions have more than one process at their origin; German *Menstruation* (and its Dutch cognate *menstruatie*), for instance, is classified under foreign loan as well as derivation.

A couple of the mechanisms and their examples require further discussion. First, Casas Gómez (1986) defines syntagmatic grouping as the addition of an innocent qualifier to a word referring to taboo content. The popular Mandarin expression 大姨妈 'big aunt' also falls under this category; the modifier *big* is typical of pre-modern polite terms of address in Chinese (Lee, 2020, p. 3). Second, the composition process should be interpreted within the specific context of taboo verbalizations, including only compositions of a marked and an unmarked item in the category. To delineate composition from syntagmatic grouping and from periphrasis, marked items were further defined as items with a close metonymic connection to menstruation and unmarked items as items that stand in a euphemistic and more distanced metaphorical relation to the menstrual content.

Third, a cultism is described by Casas Gómez (1986) as a borrowing term from a classical language that has penetrated language use through culture. To accommodate for the Mandarin Chinese expressions, the classical criterion was not applied strictly. Rather, the focus lay on the historically significant aspect of the process, so that expressions including terms from traditional Chinese medicine (e.g., 癸 in 癸水 and 天癸, the last of the ten heavenly stems, referring to a specific day within a cyclic week) were also included as cultisms.

Fourth, antonomasia was broadly interpreted as all representations of menstruation as a human agent. Many of these expressions have further metonymic or metaphorical processes at their origin, conceptualizing MENSTRUATION through sources such as RED THINGS (German *Tante Rubina* 'aunt Ruby'), COMMUNISM (Dutch *de Russen* 'the Russians'), NATURE (Dutch *moeder natuur* 'mother nature'), and BLOOD (German *die Blutgräfin* 'the blood countess'). In order to not over-complicate the analysis, however, this study refrained from an examination of metaphor and metonymy within antonomasia expressions.

All X-phemistic mechanisms that lie at the base of the expressions for MENSTRUATION can now be classified into the X-phemistic categories (i.e., euphemistic, dysphemistic, and orthophemistic). Typically, euphemistic processes include highly evasive mechanisms such as generic terms or allusive circumlocutions, whereas dysphemistic processes such as antiphrasis or creative reinterpretation reinforce stigmatization through intensification and humor, and orthophemistic processes like periphrasis give rise to neutral and more direct expressions for the taboo concept.

4.1.2. Source

Metaphorical and metonymic expressions for menstruation all take the menstrual concept as their target and use a variety of source domains or vehicles to map onto the taboo topic. For reasons of terminological ease and because the distinction is not of further importance, however, both metaphorical source domains and metonymic vehicles are subsumed under the term *sources* in this study. Before going on to its operationalization, however, a couple of critical points on CMT should be addressed. Although conceptual metaphor theory received an important status within cognitive semantics, critics have pointed out certain pitfalls in its methodology. A first often voiced concern is that the setting up of conceptual metaphors in traditional CMT

research is mostly intuitive and based on limited linguistic data. Conceptual metaphors are postulated on the basis of a few decontextualized examples, after which the internal metaphorical mappings are fleshed out (Kövecses, 2008, p. 170). Although Kövecses argues that this top–down method is not necessarily problematic as long as the conceptual metaphor is the main point of focus, this study adopts a bottom–up approach to conceptual metaphors that is more in line with a primarily linguistic research goal. Since our focus lies on language and conceptualization through linguistic metaphors, a bottom–up direction of analysis is more suitable. Therefore, this study takes an onomasiological perspective and starts out from the target concept. All competing expressions for menstruation are taken into consideration, and their frequencies are compared and weighed (for more on the statistical analysis used, see Section 4.3).

A second point of criticism is that CMT often focuses on the universal properties of conceptual metaphors, thereby neglecting the culture-specific aspects of conceptualization. Metaphors may vary along *cross-cultural* as well as *within-culture* dimensions (Kövecses, 2004, 2010) as they are strongly embedded within a specific cultural and historical background, a social context, or a personal embodied experience. To ensure a complete view on metaphor, Kövecses (2008) argues to also take the local context into account when working within the CMT framework. By taking an explicitly socio-cultural perspective in this study and investigating variation in menstrual conceptualization on the basis of age, menstrual experience and language and culture (see Section 4.2), we hope to contribute to more context-based research on metaphor and metonymy.

After the annotation for X-phemistic mechanisms, each expression classifying as metaphor or metonymy was further categorized according to its source(s). For instance, German *Erdbeerwoche* 'strawberry week' draws from two sources: RED THINGS and PERIODICITY. The first is metaphorically connected to MENSTRUATION: on the basis of a color similarity, strawberries are mapped onto the menstrual content. The second source, PERIODICITY, is an integral factor of the menstrual process, so that PERIODICITY and MENSTRUATION express a metonymic PART FOR WHOLE relation. In total, 8 metonymic and 13 metaphorical sources were found in the dataset. They are listed and exemplified in Tables 3 and 4. The correspondent conceptual mappings are provided in the third column.

Many of these sources correspond to semantic classifications noted in previous studies on menstrual expressions (Agyekum, 2002; Allan & Burridge, 2006; Ernster, 1975; Gathigia et al., 2018; Hays, 1987; Joffe, 1948; Newton, 2016).

As is apparent from the given examples, some menstrual expressions draw exclusively from one source (e.g., German *Tage* 'days' from PERIODICITY), whereas others draw from multiple sources simultaneously (e.g., Dutch *rode vlag* 'red flag' from RED and SIGNAL). Notice also that some of the sources are connected to one another: both WATER and RED have a strong connection to BLOOD, and expressions representing menstruation as COMMUNISM mostly build on an interpretation of communism as RED THING. However, including these interconnected categories separately ensures a fuller picture on the linguistic conceptualization of menstruation. After all, conceptualizations in terms of water do significantly differ from conceptualizations in terms of blood, especially regarding the expression's X-phemistic connotation.

Now that the various metaphorical and metonymic mappings have been introduced, euphemistic, dysphemistic, and orthophemistic conceptualizations of menstruation can be more readily defined. Euphemistic representations include sources like VISITATION and ARRIVAL, which steer clear of the most tabooed aspect of menstruation, that is,

Table 3. Metaphorical sources in menstrual expressions

Metaphorical		
Sources	Examples	Conceptual mapping
Arrival	Dutch *de rode Ferrari staat voor de deur* 'the red Ferrari is standing at the door' German *die rote Tante ist da* 'the red aunt is here' Mandarin 亲戚来了 'the relative came'	MENSTRUATION IS ARRIVAL
Intrusion	Dutch *de Russen zijn binnengevallen* 'the Russians have invaded' Mandarin 月经 'monthly passing through'	MENSTRUATION IS INTRUSION
Visitation	Dutch *bezoek van moeder natuur* 'a visit from mother nature' German *roter Besuch* 'red visit'	MENSTRUATION IS VISITATION
Ailment	Dutch *ongesteld* 'unwell' German *unpässlich* 'indisposed'	MENSTRUATION IS AILMENT
Dirt	Dutch *bucht* 'mess'	MENSTRUATION IS DIRT
Loss	Dutch *bloedverlies* 'blood loss' German *ich verliere Blut* 'I am losing blood'	MENSTRUATION IS LOSS
Nature	Dutch *rode maan* 'red moon' Mandarin 天癸 'sky *cycle* day'	MENSTRUATION IS NATURE
Signal	Dutch *de rode vlag hangt uit* 'the red flag is up' German *die Gebärmutter grüßt* 'the uterus sends its regards' Mandarin 月信 'monthly letter'	MENSTRUATION IS SIGNAL
Red things	Dutch *de rode Ferrari staat aan de deur* 'the red Ferrari is at the door' German *Erdbeerwoche* 'strawberry week'	MENSTRUATION IS RED THING
Water	Dutch *doorlekken* 'to leak through' German *rote Welle* 'red wave' Mandarin 来潮 'rising tide'	MENSTRUATION IS WATER
Danger	Dutch *de vloek* 'the curse' German *das Teufelchen* 'the little devil'	MENSTRUATION IS DANGER
Communism	Dutch *CCC-aanslag* '*Cellules Communistes Combattantes* attack' German *Kommunismus* 'communism'	MENSTRUATION IS COMMUNISM
Unavailability	Dutch *pauzeweek* 'break week' German *monatliche Betriebsstörung* 'monthly shutdown' Mandarin 例假 'routine vacation'	MENSTRUATION IS UNAVAILABILITY

menstrual blood (Allan & Burridge, 2006; Newton, 2016; van Lonkhuijzen et al., 2022). Conceptualizations of menstruation that reference its main features directly through sources like BLOOD and PERIODICITY are deemed orthophemistic. Situated between orthophemistic and dysphemistic domains are those which are connected to blood, but which simultaneously intensify and humorize its red and fluid properties, like RED, RED THINGS, and WATER. Lastly, clearly dysphemistic domains are DIRT, INTRUSION, AILMENT, or DANGER, which stem from historical misconceptions of menstruation as an illness and menstrual blood as a hazardous waste.

4.2. Three explanatory variables

4.2.1. L1 and associated cultural backgrounds
The categorical variable of L1 and associated cultural background has three possible values: Dutch ('NL'), German ('DE'), and Mandarin Chinese ('CHI'). It measures

Table 4. Metonymic sources in menstrual expressions

Metonymic		
Sources	Examples	Conceptual mapping
Blood	Dutch *maandelijkse bloeding* 'monthly bleeding' German *Regelblutung* 'regular bleeding'	PART FOR WHOLE
Body	Dutch *hormonaal geladen* 'hormonally loaded' German *die Gebärmutter grüßt* 'the uterus sends its regards' Mandarin 身上来了 'to come onto the body'	PART FOR WHOLE
Fertility	Dutch *loops zijn* 'to be (like a dog) in heat' (literally 'to be runny')	CAUSE FOR EFFECT
Pain	Dutch *eierstokkenpijn* 'ovary pain' German *Bauchschmerzen* 'stomach pain'	EFFECT FOR CAUSE
Periodicity	Dutch *tijd van de maand* 'time of the month' German *Tage* 'days' Mandarin 月经 'monthly passing through'	PART FOR WHOLE
Red	Dutch *rode vlag* 'red flag' German *rote Woche* 'red week'	PART FOR WHOLE
Sanitary protection	Dutch *vodden* 'rags' German *am Fetzen sitzen* 'to sit on cloths'	PART FOR WHOLE
Woman	Dutch *vrouwenkwaaltje* 'female ailment' German *Mädchenzeit* 'girl time'	AGENT FOR EVENT

variation from a cross-linguistic perspective, but the implications of the variable go beyond purely linguistic differences. The language of the respondent and, consequently, of the menstrual expressions reported by that respondent, is also an indicator of the culture they stem from and interact with. Based on the prevailing negative attitude toward menstruation and menstrual blood in the Netherlands (van Lonkhuijzen et al., 2022, see Section 2.1.2.1), Dutch respondents are expected to veer toward dysphemistic expressions, with frequent use of sources such as DIRT, RED, or WATER, which stigmatize or intensify menstrual blood's central properties. However, the broader evolution in Western countries toward a more open discussion on menstruation, as well as some characterizations of menstruation as a natural occurrence reported by van Lonkhuijzen et al. (2022), might also be present in the data through orthophemistic mechanisms and sources. For German respondents, we predict a similar combination of dysphemistic and orthophemistic expressions, with a larger share of orthophemisms due to the recent "new" menstrual discourse in Germany, as noted by Klein (2021). For Mandarin Chinese respondents, finally, the secretive attitude toward menstruation in China and Taiwan and the overall polite and evasive behavior toward taboo concepts in Chinese society are expected to result in a large share of euphemistic expressions, with an absence of any direct mentions of menstruation. According to Lee (2020), such a preference for euphemistic terminology is characteristic of the Chinese language. Based on the prevalent controlling attitude toward menstrual blood (e.g., the decision by the China Advertisement Association), the use of any orthophemistic or dysphemistic source directly related to blood is expected to be sparse.

Earlier, we highlighted the intricate links between cultures, countries, and languages and stressed that the cultural attitudes toward menstruation for

speakers of Dutch, German, or Mandarin Chinese may showcase internal variation as each of these languages are spoken across multiple countries and cultures. At this point, it is important to add that not only the speaker groups of a language, but languages in themselves, too, are not monolithic. For instance, Dutch has multiple varieties, and a menstrual expression like *ongesteld* "unwell" is typical of Netherlandic Dutch only. As it is hardly used in Belgian Dutch, its high frequency in the Dutch sample is therefore not entirely reflective of the linguistic conceptualization of menstruation for all speakers of Dutch. For reasons of time and space limitations, however, the current study does not systematically differentiate between language varieties but discusses each language from a monolithic perspective.

4.2.2. Menstrual experience

The categorical variable of menstrual experience has two values: 'direct' and 'indirect', referring to the type of experience the language user has had with the menstrual process. Especially when using the framework of CMT, a division based on experience rather than assigned sex provides a more interesting background as conceptual metaphors are believed to be grounded in (bodily) experience (Kövecses, 2017). The studies discussed in Section 2.1.2.2 point toward a considerable degree of menstrual stigmatization coming from the "indirect" respondent group. Whereas men and women do not seem to differ in terms of secretive or shameful attitudes, men do seem to have generally more negative attitudes toward menstruation, menstrual blood, and menstruating individuals. On the basis of these findings, the expectation arises that non-menstruating language users will generally use dysphemistic mechanisms and sources to verbalize menstruation. Menstruating language users, on the other hand, are expected to prefer orthophemistic or euphemistic expressions in order to tackle or evade the high taboo value attributed to the menstrual process they experience. Based on the findings by Ernster (1975) and Newton (2016), we expect non-menstruators to veer toward sources such as WATER and RED and menstruators to prefer the source PERIODICITY and the mechanism of *antonomasia*, personifying menstruation as a female visitor, friend or relative.

4.2.3. Age group

The originally numeric variable age was turned into a categorical variable age group ('young', 'middle', 'old'), a necessary transformation to execute correspondence analysis. The research overview in Section 2.1.2.3 indicates that menstruation is approached most discretely in the eldest generation, so we expect more euphemistic expressions coming from this respondent group. No studies have found any clear-cut differences in menstrual attitudes between the middle and youngest groups, but the ongoing progression in the menstrual debate suggests that we may find an overall increase in orthophemistic menstrual verbalization. As the apparent time hypothesis in sociolinguistic studies assumes that variation between different age-groups reflects linguistic change in progress (Labov, 2001), we may expect more orthophemistic approaches to the menstrual taboo from the younger respondents, with an increase in evasiveness for the middle group.

4.3. Statistical analysis

After the annotation process, the total number of data points amounted to 4048 for X-phemistic mechanism and 2483 for source. These numbers surpass the amount of menstrual expressions in the dataset because the majority of the lexemes have multiple processes and/or sources at their origin. Separate frequencies for each X-phemistic mechanism and for each source within the mechanisms of metaphor and metonymy can be found in Supplementary material S1, and data point frequencies for both variables across socio-cultural groups are provided in Supplementary material S2.

Variation in the use of X-phemistic mechanisms and sources in terms of language, age group, and menstrual experience was examined through a regression analysis. Since X-phemistic mechanism and source comprise 19 and 21 values, respectively, they necessitate a statistical analysis that accommodates such large numbers of categories for response variables. A fitting candidate is correspondence analysis, a regression-based technique that handles multi-category variables efficiently by converting data on the co-occurrence of values for categorical dependent and independent variables into a frequency table, and that subsequently analyzes the relationships between the rows and columns of the obtained data frame. The analysis was carried out with R version 4.2.2 (R Core Team, 2022), using the corregp-package by Plevoets (2015). The R scripts and the summary data used for the analysis are available on OSF.

For both respondent variables, a screeplot of the eigenvalues indicated that considerable explanatory power was found for two latent dimensions[1], cumulatively explaining 84.65% of the variation for X-phemistic mechanism and 71.53% for source. The data comprising these two latent axes were further analyzed on the basis of ANOVA Type III tests in order to identify the best model. For X-phemistic mechanism, all three main effects are significant, as well as the interaction between L1 and age-group. For source, no interactions were found, but each main effect does contribute significantly to the variation in the data.

5. Results

The results of the correspondence analysis are plotted in a two-dimensional coordinate space, in which each axis reflects one of the latent dimensions that were found through regression. The levels of the dependent variable are presented in gray, whereas the levels of the independent variables are red. The latter are accompanied by their confidence regions, which are plotted as confidence ellipses in the two-dimensional space. The distance between levels is inversely reflective of their degree of association: short distance indicates high association. Importantly, these plots represent an analysis that was based on tokens and not types. This corresponds more to a usage-based perspective: a frequently used lexeme within a particular respondent group is highly entrenched in the minds of its speakers, whereas five different infrequent lexemes of the same category in another respondent group are not as

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[1]Arguably, a third axis could have been included in the analysis, both for X-phemistic mechanism and Source. But because the identification of an 'elbow' on the screeplots after the third axes was not convincing enough, it was not incorporated here. However, the alternative analysis with three axes is available in the R scripts of this study, made available through OSF.

reflective of the speakers' mental reality. The technique of regression analysis takes these various frequencies into account and, based on estimated probabilities, presents all levels on the plot according to their degree of association. Low-frequency mechanisms or sources do not render high association values as they are based only on sparse occurrences. However, it remains important to be aware of the frequency distribution of all response levels when interpreting the correspondence plots. Supplementary material S1 therefore provides an overview of the frequency of each X-phemistic mechanism and source.

Very low-frequency mechanisms (i.e., below five occurrences) include allusive circumlocution (*meer naar het toilet moeten* 'to need to go to the toilet more often'), antiphrasis (*maandelijks cadeautje* 'monthly present'), code-switching (German *days*), litotes (*definitiv nicht-schwanger* 'definitely not pregnant'), and paronym substitution (*eine Tagung abhalten* 'to hold a conference', based on phonetic similarity with *Tage* 'days'). This is not unsurprising as these mechanisms are either rare in general (e.g., paronym substitution) or highly context-based (e.g., allusive circumlocution), and the survey for data collection did not provide any pragmatic context. The most frequent mechanism by far is metonymy, with 1832 occurrences, the majority of which draw from the source domain of PERIODICITY. The cyclical aspect of menstruation appears to be highlighted most in menstrual expressions. Such expressions allow the language user to refer to menstruation through one of its central properties, yet steer clear from mentioning the highly stigmatized aspect of menstrual blood. This blend of euphemistic and orthophemistic reference might explain the popularity of the PERIODICITY metonymy. Other highly frequent X-phemistic mechanisms are mostly semantic and figurative processes such as antonomasia and metaphor, with the addition of the formal mechanism of reduction. In terms of sources, metaphorical NATURE and metonymic FERTILITY were found less than five times in the dataset, despite some reported menstrual attitudes which presented menstruation as a natural, healthy process indicating fertility. Besides the notable productivity of the PERIODICITY source, metaphorical sources RED THING and VISITATION and metonymic sources BLOOD and RED all occurred more than 100 times in the dataset. Keeping these distributions in mind, we can now take a look at the correspondence plots.

Fig. 1 is a biplot for X-phemistic mechanism in terms of the main effects. The most obvious effect is found for L1 and associated cultural background. The first, horizontal axis indicates that much of the variation in terms of X-phemistic mechanisms can be explained through linguistic and cultural differences between German ('DE') and Dutch ('NL') on the one hand, and Mandarin ('CHI') on the other. Chinese, furthest from German and Dutch both in genealogical and geographical terms, behaves significantly differently from the two Indo-European languages. This suggests that linguistic and cultural distance has a strong effect on manners of conceptualization. Processes typically associated with Mandarin language use are generic terms (e.g., 月事 'monthly thing') and syntagmatic groupings (e.g., 大姨妈 'the big aunt'), both of which are techniques that are highly evasive of taboo content. This tendency toward euphemistic mechanisms is in line with our expectations for Mandarin; the secretive attitude concerning menstruation appears to be present in Chinese society as well as in the Mandarin language.

Dutch and German are separated along the second, vertical axis, and the distribution of the linguistic processes reveals some differential uses between the two languages; even within more similar languages and cultures, variation can be found in
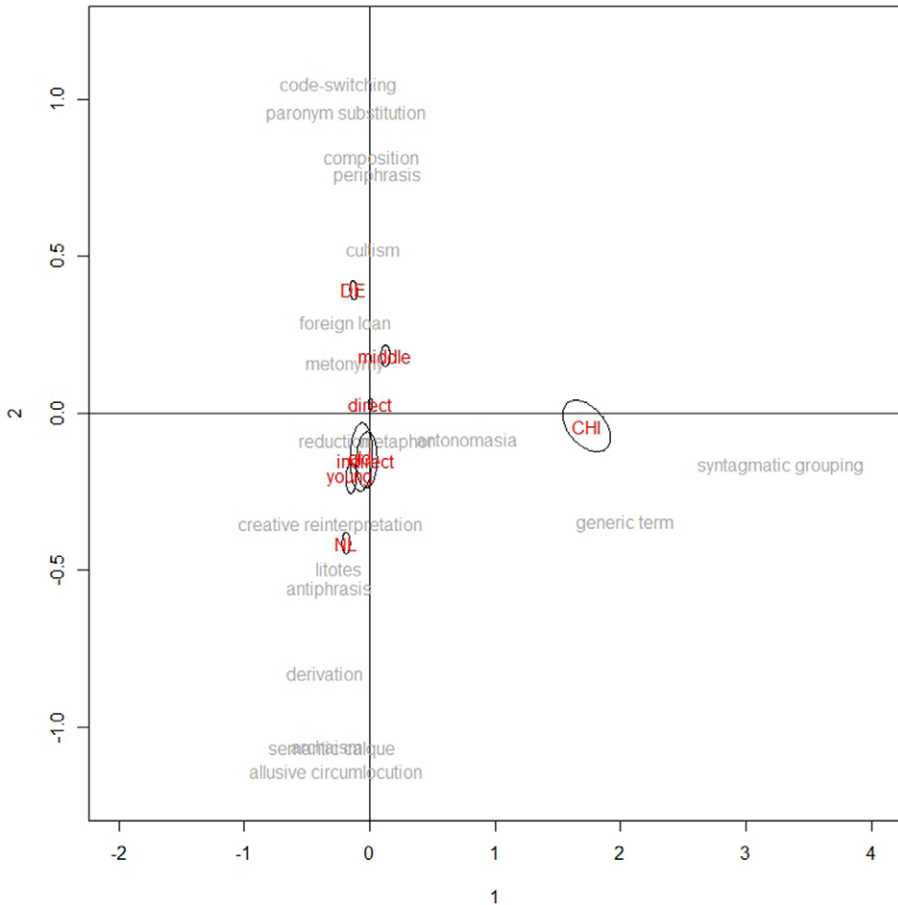
Figure 1. Correspondence plot for X-phemistic mechanisms and the main effects.

terms of the prevalent conceptualization patterns for menstruation. Situated closely around German in the plot are code-switching (e.g., *days*), paronym substitution (e.g., *eine Tagung abhalten* 'to hold a conference', based on phonetic similarity with *Tage* 'days'), composition (e.g., *Erdbeerwoche* 'strawberry week'), periphrasis (e.g., *Monatsblutung* 'monthly bleeding'), cultism (e.g., *Zyklus* 'cycle'), and foreign loan (e.g., *shark week*). Dutch is most associated with creative reinterpretation (e.g., *Rode Zee* 'Red Sea'), litotes (e.g., *niet zwanger zijn* 'to not be pregnant'), antiphrasis (e.g., *maandelijks feestje* 'monthly party'), derivation (e.g., *menstruatie* 'menstruation'), semantic calque (e.g., *periode* 'period'), archaism (e.g., *maandstonden* 'monthly time intervals'), and allusive circumlocution (e.g., *meer naar het toilet moeten* 'to need to go to the toilet more often'). The correlation between German and paronym substitution and between Dutch and allusive circumlocution, however, is merely based on one attestation each and should therefore not be interpreted as a robust association.

Some of the different processes associated with Dutch and German do have similar X-phemistic effects. For instance, although composition appears to be a typically

German technique and derivation is associated with Dutch speakers, both are formal, morphological mechanisms with a euphemistic effect. Either by adding an unmarked element or by changing the form into a less direct expression of the tabooed concept, German and Dutch speakers mitigate the taboo in language. Similarly, the typically Dutch processes of semantic calque and archaism are analogous to German-associated code-switching, foreign loan, and cultism in that these processes all draw from a distant repertoire in order to diminish the affective value of the menstrual taboo. In that sense, these processes appear to have a euphemistic effect. When taking a closer look at the archaisms, on the one hand, and the foreign loans and cultisms, on the other, however, many archaisms display dysphemistic overtones by representing menstruation as a dirty process (e.g., Dutch *brol* 'junk'), whereas foreign loans and cultisms often draw from classical languages (e.g., German *Menses* 'menses', lit. 'months') and have a neutral, almost clinical connotation. This characterization of Dutch as dysphemistic and German as orthophemistic is also clear in the division of the processes of antiphrasis and creative reinterpretation (e.g., *Rode Zee* 'Red Sea' or *maandelijks feestje* 'monthly party' humorously tackle the taboo, yet retain a rather blunt undertone) as opposed to the direct and matter-of-fact process of periphrasis (e.g., *Monatsblutung* 'monthly bleeding' neutrally presents the main aspects of menstruation). An inspection of the data does reveal that the high correlation between Dutch and creative reanalysis is mostly due to one frequent expression in Dutch, that is, *de Rode Zee* 'the Red Sea'. German speakers do make use of many creative and crass lexemes (e.g., *rote Zora* 'red Zora', a character from a children's movie or the loan *Bloody Mary*, historical English royalty and the eponymous cocktail), but the tokens of these lexeme types are much less frequent.

The effects of age and menstrual experience are much less distinct. Regarding the latter category, the confidence ellipses of the direct and indirect groups do not overlap, indicating statistically significant variation, but the limited distance between them makes it difficult to deduce anything. Interestingly, we find overlap between the younger and older age-group but a statistically significant difference in conceptualization patterns from the middle category. Moreover, older, younger, and non-menstruating language users display a highly similar distribution, whereas middle-aged and menstruating speakers are situated more closely together on the plot. Analogous conceptualization patterns for the middle-aged and menstruating groups are not unexpected as both groups were predicted to use a combination of euphemistic and orthophemistic mechanisms and sources. Older and non-menstruating groups, too, were expected to display similar, more dysphemistic behavior. The position of the youngest group of language users, however, goes against expectations. Instead of generally orthophemistic conceptualizations of menstruation, this group appears to use similar mechanisms to the older and non-menstruating groups, preferring dysphemistic, humorous techniques to represent the menstrual process.

The linguistic process of antonomasia lies in the center of the plot, with approximately equal distance from each of the explanatory variable levels. The personification of menstruation appears to be a universal technique. The representation of menstruation as a relative is particularly popular, and phrases referring to aunts are shared across all three languages (e.g., Dutch *tante Rosa* 'aunt Rose', German *die rote Tante* 'the red aunt', and Mandarin 大姨妈 'big aunt'). Other centrally located processes are metonymy, metaphor, and reduction, which act as highly productive processes in all socio-cultural groups. The popularity of antonomasia, metonymy,

and metaphor in expressions for menstruation shows the productivity of figurative processes in generating expressions for taboo.

ANOVA also indicated a revealing interaction between age-group and L1, which is plotted in Fig. 2. Whereas the differences in X-phemistic mechanism use for young, middle-aged, and older respondents are minimal in Dutch and German, Mandarin Chinese speakers of different age-groups showcase more variation. The confidence ellipses indicate a statistically significant difference between young and middle-aged Mandarin language users. The large confidence ellipsis of the older category is due to the low number of data points for this group of respondents ($N = 8$). Although these limits of the data should be taken into account, a clear trend can be distinguished for Mandarin Chinese speakers: whereas the older Chinese respondents stick to syntagmatic grouping and generic terms informed by politeness strategies, middle-aged and especially younger Chinese speakers are moving toward a more direct approach. This progressive change appears to be in line with the recent increase in public consciousness and awareness for menstrual difficulties in China (Guo et al., 2022).
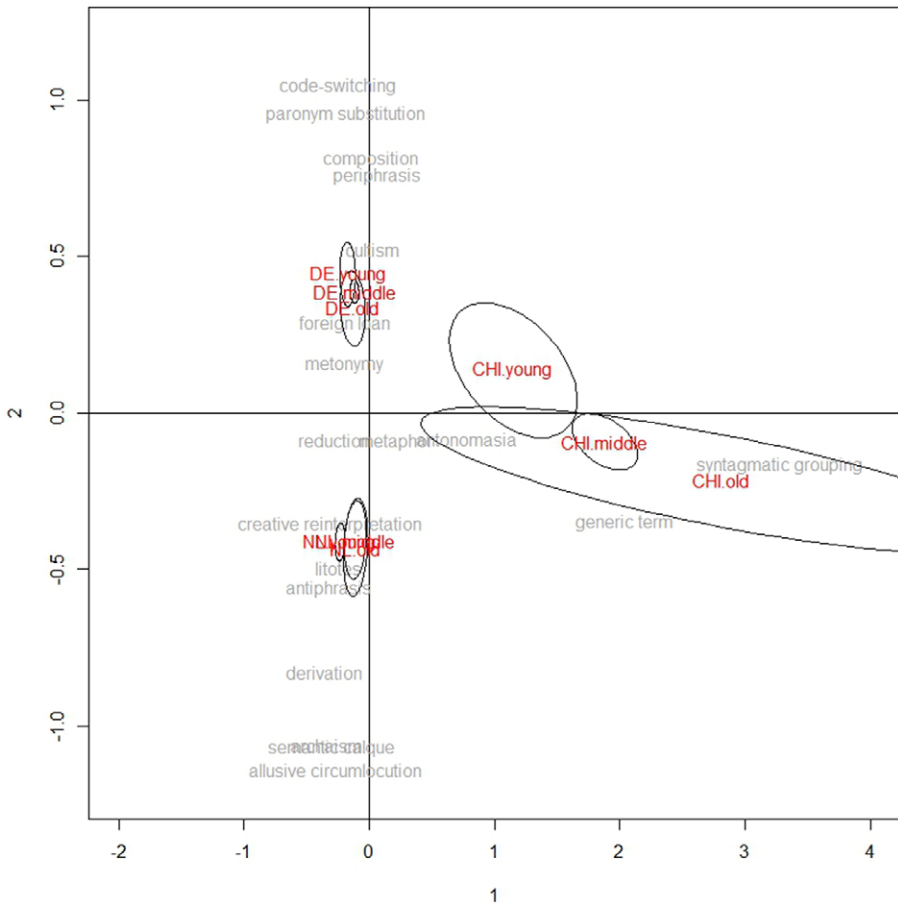
Figure 2. Correspondence plot for X-phemistic mechanisms and the interaction between age group and L1.

The correspondence plot for source and the three main effects can be found in Fig. 3. Note that the axes are scaled slightly differently from those in the X-phemistic mechanism plots for reasons of clarity. In terms of L1 and associated cultural background, Mandarin Chinese is again placed along the first axis, in contrast to German and Dutch. Sources strongly correlating with Mandarin are NATURE (e.g., 天癸 'sky *cycle day*'), ARRIVAL (e.g., 来大姨妈了 'the big aunt came'), and UNAVAILABILITY (e.g., 例假 'routine vacation'). The strongest association is found for the source ARRIVAL and is due to the highly productive addition of 来 'come' to a large number of the attested expressions, even those not personifying menstruation. For instance, next to M. (an abbreviation of the loan *menstruation*), a number of respondents submitted 来M. '*M. comes*'. The Mandarin associated domain BODY (e.g., 身上来了 'to (have) come onto the body') is one of the most direct conceptualizations of menstruation, referencing its physiological properties. However, the correlation with dysphemistic sources such as RED, DIRT, and DANGER or orthophemistic sources such as BLOOD is extremely low.
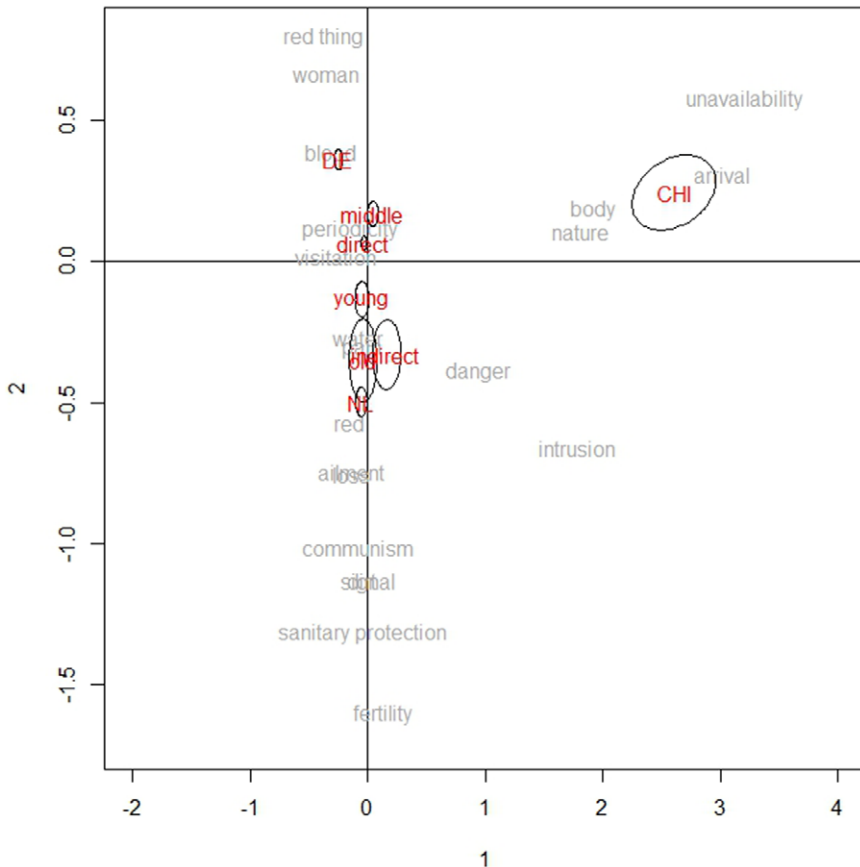
Figure 3. Correspondence plot for Source and the main effects.

Overall, then, a mostly euphemistic picture arises for Mandarin speakers; with the exception of more direct domains such as BODY or NATURE, which each have a very low number of occurrences, Mandarin expressions for menstruation mostly reference vague and euphemistic concepts rather than precisely mentioning aspects such as menstrual blood, or intensifying negative properties of the menstrual process. This is what we expected based on the secretive attitude toward menstruation in Mandarin Chinese speaking regions.

Contrastingly, for German and Dutch, strong associations are found for sources referencing the tabooed bleeding aspect of menstruation. In line with the tendency toward direct periphrasis, references of BLOOD (e.g., *Regelblutung* 'regular bleeding') are highly associated with German language users. The plot also shows that the Dutch respondents submitted a larger proportion of items referencing RED (e.g., *de rode vlag* 'the red flag') and WATER (e.g., *de rode vloed* 'the red tide'). Although these sources, like the BLOOD domain, do not evade reference to menstrual blood, they are interpreted as mostly dysphemistic due to their intensifying and ridiculing effect. Further findings for the conceptualization of menstruation in German are strong correlations with metonymic WOMAN (e.g., *Mädchenzeit* 'girl time') and metaphorical RED THING. The latter is mostly due to the popular phrase *Erdbeerwoche* 'strawberry week', a rather euphemistic expression for menstruation.

Dutch speakers draw from a variety of sources that can be linked to the historical and current underpinnings of the menstrual taboo; DIRT (concealed under SIGNAL on the correspondence plot, and exemplified in *bucht* 'mess') and AILMENT (e.g., *vrouwenkwaaltje* 'female ailment') are connected to outdated misconceptions of menstruation as a process of purification and as a weakening illness (Allan & Burridge, 2006; Newton, 2016), whereas FERTILITY (e.g., *eilozing* 'egg discharge'), SIGNAL (e.g., *de Japanse vlag hangt uit* 'the Japanese flag is up'), and SANITARY PROTECTION (e.g., *vodden* 'rags') are part of the historical and contemporary issue of controlling menstrual blood and the fear of it "leaking". The association with AILMENT and SIGNAL is mostly due to one frequent lexicalization for each domain; *ongesteld* 'unwell' and *rode vlag* 'red flag', respectively. Lastly, the creative domain of COMMUNISM (e.g., CCC-aanslag '*Cellules Communistes Combattantes* attack'), bringing together aspects of redness and, as is the case in many expressions, intrusion, or danger, is typically used by Dutch speakers. This source is similar to a mechanism such as creative reinterpretation in that it uses rather offensive humor to conceptualize the menstrual taboo. Overall, the findings for source in Mandarin, German, and Dutch are in line with those for X-phemistic mechanisms. Mandarin generally uses euphemistic conceptualizations, and both German and Dutch display more direct blends of orthophemistic and dysphemistic sources, with a majority of dysphemistic expressions for Dutch.

For menstrual experience, the distinction between 'direct' and 'indirect' is more visible than it was for X-phemistic mechanisms. Non-menstruators appear to use more dysphemistic references (conceptualizing MENSTRUATION as RED, e.g., *rode pauze* 'red break', WATER, e.g., *ze lekt* 'she's leaking' and DANGER, e.g., *de vloek* 'the curse'), whereas menstruating speakers prefer more neutral and euphemistic expressions (conceptualizing MENSTRUATION as PERIODICITY, e.g., *Zeit des Monats* 'time of the month' and VISITATION, e.g., *Tante Roos is op bezoek* 'Aunt Rose is visiting'). Interestingly, levels for menstrual experience and levels for age-group show the same distribution as they did for X-phemistic mechanisms. On the one hand, the middle-aged respondent group employs largely the same euphemistic domains as the

menstruating group. On the other hand, the younger and especially the older respondents behave similarly to non-menstruators by using more stigmatizing, dysphemistic language.

6. Discussion

This study examined expressions for the menstrual taboo in order to investigate socio-cultural variation in the linguistic conceptualization of menstruation. Methodologically, we combined the theoretical notions of X-phemistic mechanisms and source domains for an innovative methodological approach to conceptualization in taboo verbalizations. The onomasiological perspective of Casas Gómez's (1986) X-phemistic theory ensured a complete profile of menstrual expressions that went beyond solely metaphorical and metonymic mechanisms, whereas CMT helped to further flesh out these two most productive processes in taboo verbalization. This resulted in an extensive picture of menstrual conceptualization.

We subsequently examined the various conceptualization patterns within our data in terms of socio-cultural variables. This was done to verify whether differing menstrual attitudes of various linguo-cultural, menstrual, or generational groups are reflected in language. More specifically, we formulated the hypothesis that those groups which displayed a highly secretive attitude would veer toward euphemistic conceptualization, those groups in which a strong degree of stigmatization occurred would generally use dysphemistic mechanisms and sources, and the groups more openly discussing menstruation tend to conceptualize menstruation orthophemistically. A correspondence regression analysis found the largest effect for L1 and associated cultural backgrounds. Both in terms of X-phemistic mechanisms and sources, a generalized characterization of Mandarin Chinese respondents as mitigating, polite, and evasive (i.e., mostly euphemistic); German respondents as direct and matter-of-fact (i.e., mostly orthophemistic); and Dutch respondents as offensive and humorous (i.e., mostly dysphemistic) ensued. These differences in linguistic behavior are reflective of their cultural contexts. Whereas the menstrual taboo has recently become more open to discussion in German society, the typically more traditional and polite Chinese society surrounds the subject with more secrecy. The mixed attitude toward menstruation reported for Dutch speakers results in a blend of orthophemistic and dysphemistic conceptualizations. Besides stressing cross-cultural differences, however, it is important to also make note of commonalities. Not only did sources such as metaphorical WATER and metonymic PERIODICITY occur in all three languages, certain X-phemistic mechanisms were attested cross-linguistically as well. Antonomasia, metaphor, and metonymy, for instance, turned out to be popular processes in all languages.

For menstrual experience, it was found that respondents with direct menstrual experience tend to refer to the physiological phenomenon euphemistically or orthophemistically, whereas expressions submitted by the non-menstruating class of respondents were typically more dysphemistic, drawing directly from domains associated with blood. For age group, the oldest and youngest category both showcased direct and dysphemistic behavior, but the middle-aged respondents were more likely to make use of euphemistic processes and sources. Only for the subcategory of Mandarin speakers, the expected distribution was found for X-phemistic mechanisms: a generational decrease in evasiveness with the oldest speakers employing most

euphemistic mechanisms, the middle-aged respondents moving toward a more open discussion of menstruation, and the youngest most closely associated with ortho-phemistic processes. The unexpected behavior of the youngest age group at large may be linked to Chrisler's (1988) finding that New Jersey students characterize menstruation as significantly more debilitating and bothersome than adults of 30–39 years old, yet the same study found that these students were also significantly more inclined to deny the effects of menstruation. It is also possible that the younger generation is using humorous mechanisms and sources not in order to stigmatize menstruation, but to make light of it in an ironic manner. Of course, it may simply be true that a more negative menstrual attitude exists within the youngest group, although this seems unlikely considering most progressive critiques on the menstrual taboo arise from this particular speaker group. Further research on menstrual attitudes and conceptualizations within this group of language users might provide interesting results.

It should be said that this study has some notable limitations. In terms of respondent data, the research could have benefited from a more evenly distributed set of respondents, as especially Mandarin speakers, older respondents and non-menstruators remained underrepresented in the dataset. It should also be noted that neither of the authors are speakers of Mandarin Chinese. Although the help of a sinologist was enlisted for the set-up of the Mandarin questionnaire and the translation of its answers, our inexperience with Chinese languages may have led to slight misunderstandings when annotating for the conceptualization of menstruation. For reasons of feasibility, a few other limitations were imposed on the research design, yet we hope further research might shine more light on these particular aspects. Besides linguo-cultural, menstrual, and generational differences, for instance, it may be interesting to investigate other variables which might explain variation in the conceptualization of menstruation. Urbanization, for instance, may have an effect on the way in which a language user perceives and conceptualizes the menstrual process. Other plausible additional variables include education levels or, more precisely, the received education on menstruation. All of these sociological aspects could have an additional influence on menstrual conceptualization. The fact that they have not been included in the current research design makes it possible that certain tendencies were not picked up on in the analysis. Another aspect which remains undiscussed in this article is the role of actual language use in the conceptualization of taboo. Although we believe that our questionnaire, in collecting all expressions known by respondents (whether or not they actively used them), adequately measured the full mental representation of menstruation through language, data on language use specifically can provide an important complementary perspective. Therefore, an additional study investigating the usage rather than the mere knowledge of menstrual terms (e.g., in the form of a corpus study) could be an interesting contribution to research on taboo conceptualization.

Overall, however, we hope to have introduced a useful combination of frameworks for the (socio-cultural) study of taboo verbalizations. The model's flexibility and generality make it applicable to a range of other languages and taboo concepts, enabling an interesting expansion of linguistic research on stigmatized subjects. Additionally, we hope to have contributed to a better understanding of the role of language in taboo issues. As a strong connection appears to exist between attitudes toward menstruation and ways in which menstruation is linguistically conceptualized, the role of language in harmful stigmatizations of menstruation should not be underestimated. The

interaction between menstrual attitudes and expressions is not simply unidirectional. Dominant negative perceptions of menstruation can be reinforced through long-standing use of dysphemistic menstrual expressions, whereas euphemistic terminology continues to provide a way out of an open discussion of the taboo. To critically think about the way in which we speak about taboo is crucial, precisely because the way we speak about the monthly bleeding shapes the way we think about it.

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